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## POST-WAR PLANNING

WITH respect to current non-essentials, which we have grown accustomed to think of as peacetime necessities, our supply-demand ratio has shrunk to the lowest level in history. For example, it is no longer a question of trying to create a demand for sewing machines; it is a case of trying to find a dealer who still has one to sell. So it is with clocks, electric razors, ironers, vacuum cleaners and a thousand items.

We have been parties to the greatest conversion from civilian to military economy that the world has ever witnessed. That conversion will endure and grow until victory by the United Nations has been won.

What will happen then?

With the urgency of winning the war over, this nation will have within its grasp the power to create the greatest business boom of all time. Indications are that there will exist an immediate and almost unlimited post-war demand for practically everything. Millions and millions of Americans will be clamoring to buy merchandise of every description, to fill long-felt requirements and to replace worn out equipment.

The change back to civilian economy will be designed to meet these needs. Those firms whose names have been kept before the public will begin to reap the rewards of their foresight. Those whose directors have been shrewd enough to pave the way in advance for a quick change over to peacetime production will be among the first to enjoy the new markets.

It would be well for us all occasionally to give thought at even this early date to the difficult question: How can I personally with all of my sum total of experience and particular abilities best take advantage of the golden age of infinite opportunity which will come to pass the moment peace is declared?

The world will be starved for the things that we can produce. How we go about producing them will probably leave its mark on our own grandchildren.

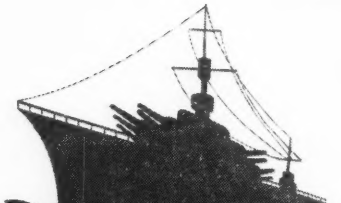
Those of us who are left after this conflict is over will be able to build as never before. Let us take care that we build well and wisely. There will be fewer of us, and the responsibility will be enormous.

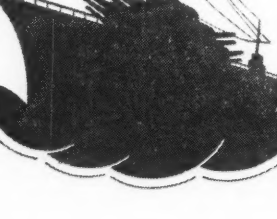
We shall not be planning a post-war world for ourselves so much. We think that the important thing will be: What sort of world would our children and their children like to inherit?

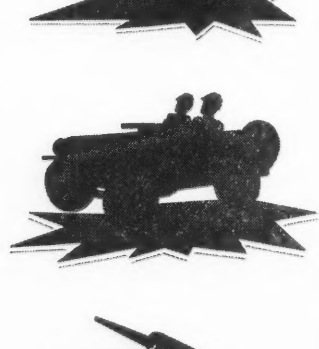
# The Electroplater and the War

By JOSEPH B. KUSHNER, Ch.E.

Metal Finishing Consultant
New York City







TO a plater who has been working with silverware and jewelry most of his life or to a plater who has been chrome plating brass toilet fixtures or brass plating steel thingumbobs since he was knee high to a nickel plating tank, there may seem to be little left to do in the plating field. This conclusion is completely erroneous. There is plenty to do in the plating field—but it will have to be war plating for the duration! The use of electroplating and related processes in our expanding war industry is growing by leaps and bounds, and we daresay that before the year is out it will take up every experienced plater we have and beg for more. A quick look at the places where electroplating does its stint for our victory effort should convince us why this is so.

## Aluminum Anodizing

Aluminum is literally and figuratively the skin and bones of our bomber and fighter planes. The aluminum has to be protected against corrosion and the only satisfactory way for doing it is by anodizing, a process closely related to plating. Anodizing is an anodic process, whereas ordinary metal plating is a cathodic process. A plating tank, a source of direct current ranging from 12 to 40 volts, and an electrolyte consisting of

either a chromic acid solution or a special sulphuric acid solution are required for the anodizing treatment. Control of the solution, particularly in the chromic acid process is not very difficult; all that is usually required is an accurate hydrometer reading and an accurate pH reading.

A thorough-going plater who is accustomed to make use of a voltmeter and ammeter and can follow simple instructions should be able to master anodizing procedure within two weeks. When it is recalled that our airplane industry is expanding at an ever greater rate to meet the needs of our war program, it shouldn't be hard to see why this one phase of war plating is going to make increasing demands for electroplaters.

## Brass Plating

Brass plating is being used in the war effort, but to a rather limited extent. Parts formerly made of solid brass are now being made of steel and brass plated. At first, when the steel cartridge case program was announced, it was thought that brass plating would provide suitable corrosion protection to the steel, but the trend is now toward zinc plating, as it is the far better deposit from the standpoint of corrosion protection. Brass of a special range of composition is plated on other metals to insure adhesion if rubber is to be applied to the basis metal. At one time the steel tracks on our fighting tanks were so plated before the rubber treads were attached. This program has been discontinued in favor of all-steel treads to conserve rubber. Nevertheless, a fair amount of brass plating is being done and as the solid brass situation becomes worse, the chances are that there is going to be an increase in brass plating.

## Cadmium Plating

Cadmium plating is very widely used in producing the implements of war. It possesses excellent non-corrosive properties, especially in marine atmospheres and is used for this reason as a protective coating for steel and brass where so exposed. On aircraft, where aluminum comes into direct contact with steel or brass, there is a tendency for accelerated corrosion of the aluminum due to its sacrificial anodic dissolution. By coating the iron and brass so exposed, the attack on the aluminum is greatly reduced. Most specifications in connection with fuse parts call for cadmium plating. The reason for this is twofold. It is a good protection from corrosion and its deposits from the cyanide bath are very smooth so that dimensional tolerances can easily be met. Some typical airplane parts that are cadmium plated are ignition wire harnesses and radio shielding. The plating solutions used are those familiar to practically every plater, but close attention must be given to specifications.

## Chromium Plating

Chromium plating is one of our "war babies." It is used practically all over the lot. The chromium plating is not the decorative type, naturally, but the type that is known as hard chromium; i.e., deposits of substantial thickness. Just to give an idea of its uses we can mention that it is plated on the rifling of gun barrels and the interior of large caliber guns because of its extreme hardness, corrosion resistance and low coefficient of friction. It is also plated on gun mounts (rollers and circles) for the same reasons. The cylinder liners of Diesel engines are plated with "porous" chromium. Tools, dies, parts, molds and shafts are built up with chromium plating. The life of many valuable dies and tools has been increased several times by chromium plating.

Chromium plating has been used on airplane propellers to reduce the abrasive effect of dust particles in the air on the propellers. Unfortunately,

chrome plating tends to cause hydrogen embrittlement of the steel blades, particularly along the edges where the current density is highest, as was pointed out by Dr. Blum at last year's American Electroplaters' Society convention. Another use for chrome plating is in the production of floodlight reflectors and cheap unbreakable mirrors for army personnel use. While the overall reflectivity of chrome is low (about 65 per cent), it does not tarnish like silver and is far less expensive than rhodium.

Chromium plating for the war effort truly offers a wide field for the plater, but the ordinary decorative chrome plater or the slipshod "rule-of-thumb" man will not succeed in it. Hard chrome plating calls for religious use of ammeter, voltmeter and ampere-hour meter, rigid and close maintenance of the solution by accurate analyses, close control of temperature and other plating conditions and, last but not least, a good deal of ingenuity in the racking of pieces to be plated so that the chromium throws properly and the deposits are uniform. There is no reason, however, why an experienced ordinary plater who has done specification plating of another type and has the "feel" for solving racking problems quickly and simply cannot succeed in this work.

## Copper Plating

Copper plating is in wide use in war industry. Probably its widest use is in the heat treatment of steel. Fairly heavy deposits, in the neighborhood of 0.0005 inch, are impervious to the carbonaceous gases used in carburizing or hardening of steel, and for this reason a copper plate makes an ideal stop-off so that certain areas of the steel remain soft and tough after the heat treatment in the hardening atmosphere, whereas the uncoated steel becomes extremely hard.

Another possible use mentioned by Dr. Blum is in depositing copper driving bands on steel shells instead of using the swaged bands fabricated from copper tubing. This, as far as we know, is still in the experimental stages. If it does work out, however, it will call for a lot of platers, as the deposits have to be heavy and the Axis is going to get a lot of these calling cards.

## Gold Plating

At the present moment gold is a metal of which we have plenty. Unfortunately, however, its war uses at the present time are somewhat limited. Up to the recent past a great many morale items such as buttons, insignia and emblems have been gold plated for the Army and Navy personnel. However, due to the shortage of brass, many of these items are now going to be made of plastics. There is some talk, nevertheless, of permitting these items to be metallized and gold plated. If this is so, then there will be more work for many gold platers.

Another place where gold plating is used is in the production of the gold thread used in weaving and embroidering various Navy emblems and insignia. Another use for gold plating is in coating infra-red reflectors used in drying lacquered, painted and plated finishes on war equipment. Gold plating is also being used to a limited extent in protecting certain silver conductors used in radio work from tarnishing.

## Indium Plating

This newcomer to the plating field is now being widely used, particularly in the aircraft industry. A deposit of indium is made on certain types of bearing faces after a plate of silver and lead. A heat treatment to diffuse the metals follows and an excellent bearing surface is the result. It seems to help in resisting the corrosive attacks of the lubricating oil decomposition products to be found in the

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crankcase of the engine. The amount plated on is somewhat critical. Only a small amount of indium on the surface is needed to increase greatly the wear life of the bearing. The usual solutions used for the plating of indium are the cyanide solution and the sulfate solution. A plater who wishes to learn more about indium plating can read up in the literature on it. Indium plating is not particularly harder than any other type of plating.

### Iron Plating

Iron plating is replacing to a large extent nickel plating for building up of worn shafts and similar parts. Iron plating is also being used to fabricate certain types of molds by electroforming them in an iron plating bath. (Another use that should interest everyone, plater and non-plater alike, is its use in the production of the plates that print Uncle Sam's War Bonds. This is one use we want to expand, all of us!)

### Lead Plating

Lead plating, heretofore a rarely used process, is now widely employed in a number of war fields. Lead is used in plating ammunition cases to protect against corrosion; lead plating is used on bearing surfaces and, along with copper plating, is used as a lubricant in drawing and forming of steel. Lead plating is used on the inside of certain types of artillery shells to prevent corrosion of the shell by the contents. The bath most widely used is the fluoborate bath, although the sulfamate solution is also finding wide use in this connection.

### Magnesium Anodizing

The metal magnesium is being used more and more in essential aircraft applications. It must be protected against corrosion and for this purpose certain anodizing treatments have been developed to prepare the magnesium for a coat of paint. Little is

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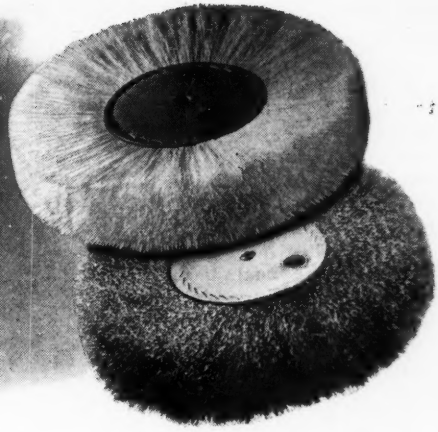

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available in the literature on the subject.

### Nickel Plating

Nickel plating is not so widely used these days because of the great demand for the metal. However. because this demand is so great, it may have to be used to save on the metal put into solid alloys. Thus a heavy nickel plate has been suggested over steel to take the place of the nickel-rich stainless steels used for fabricating airplane engine manifolds. Nickel plating to replace chrome plating of airplane propellers is another possibility.

### Plating of the Platinum Metals

Palladium plating has replaced to some extent nickel plating as an undercoat for chromium plating, such as on reflectors and mirrors. It seems to have the requisite corrosion resistance and the color is fairly close to that of nickel. More will be heard of this metal as a plating metal in the near future.

Iridium and platinum are plated on contact points that must withstand a great deal of sparking. As the supply of tungsten goes down, more and more magneto contacts and spark plug points will be plated with platinum and iridium.

Rhodium plating finds its widest use in the production of searchlight and floodlight reflectors. It makes an excellent first reflecting surface inasmuch as it has an overall reflectivity of about 75 per cent and is exceedingly resistant to tarnish.

### Silver Plating

While silver plating has not been used on a volume scale in our war effort, there are possibilities that it will find much wider use inasmuch as it is one of the metals that can be produced and supplied in sufficiently large quantities. Silver plating, as described previously under indium plating, is used in plating bearing shells in conjunction with lead and indium and put through a heat treatment to produce diffusion of the metals. If the tin situation becomes acute, there is a considerable chance that silver plating will replace the dipped tin linings for certain types of containers. If such turns out to be the case, it will enormously increase the field of silver plating in our war effort. Another extensive use for silver plating is in the production of tableware for our Army and Navy personnel.

Another place where silver plating will be used a great deal is in the plating of dental and surgical instruments. These have hitherto been plated with nickel and chrome, but the shortage of nickel may preclude this type of plating. Unfortunately, silver and even gold would not stand up very well on certain dental instruments in contact with the mercury used in silver filling amalgams, so it

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method—Two tank industrial washing machines

wash—**Actex 200** solution

rinse—Two thirds percent **Actusol** solution to inhibit rusting

**the problems** . . . Shell blanks are shipped in from a large Eastern manufacturing plant, covered with a film of oil to prevent rusting in transit. Poor removal of this oil by the previous compound was causing the dies to break down and was interfering with the painting operation.

The cups were covered with heavy, hardened drawing compound of the pigmented type. The former cleaning material was inadequate to remove this "tough" soil.

**the solution** . . . The DuBoy Man recommended that both the blanks and cups be washed with Actex #200. To prevent rusting following the cleaning operation he recommended the use of one gallon Actusol in the 150 gal. lon rinse tank.

The work came out bright and shiny. To test it, the owner of the plant took pieces out at random and wiped them on his clean, white shirt—there were no marks on his shirt, indicating perfect cleaning. Also —there is no indication of rusting during the 3 hours after cleaning and before the stamping. Formerly rusting would appear in two to three minutes.

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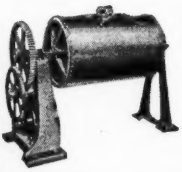

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may be necessary to continue with a nickel and chrome plate for some instruments. Undoubtedly many of the medical instruments would be perfectly satisfactory and give good service with a heavy silver plate over a copper flash, plus probably a gold flash to keep the silver from tarnishing. Silver is still widely plated for use as a first surface reflector in applications that do not involve dissipation of a great deal of heat or in sealed beam lights where chances of tarnishing are greatly reduced.

## Tin Plating

Tin for the cans that feed our troops is so vital that we are pushing all our resources in this metal (Bolivian tin) to the limit and are engaging in a huge detinning salvage program. Already electroplating is doing its part by saving as much as 40 per cent of the metal in tinning tin can stock. Tin plating gives a finer grained, less porous surface of more uniform thickness besides permitting certain other economies (as far as the metal is concerned) over hot dipped tin surfaces. A large number of steel mills are now turning to electrotinning for this reason.

Another important use for tin plating is in nitriding. Certain steel parts are hardened by treatment with nitrogen-bearing vapors. Copper, which is impervious to carbon-bearing vapors, permits the passage of the nitrogen-bearing vapors and so cannot be used as a stop-off. A tin plate varying from 0.0002 to 0.0003 inch is ideal as a stop-off for nitrogen and is therefore used in this process.

## Zinc Plating

Last, but not least, is zinc plating—the true "war baby" of this war. Zinc plating is on the upsurge and this one plating field alone is going to make heavy demands for plating personnel. To give an example of what we mean, many of the smaller cali-

# DIRT—OFF LIKE A SHOT!

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### "Cleans 37 MM. Shot Better . . . Faster . . . Cheaper"

Cleaning shot was a problem in this shell plant . . . until at the recommendation of a Sun Doctor of Industry they changed their metal cleaner—to Sun Mineral Spirits. With Sun Spirits grease and grime came off quicker . . . more thoroughly. Trouble with mixing and heating was completely eliminated . . . since Sun Spirits requires neither. In addition Sun Spirits cost less than the former cleaner.

Your plant—or any plant where metal parts are cleaned preparatory to finishing—can profit by the production-speeding advantages of Sun Spirits. For details write

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ber cartridge cases are being made of steel. This steel must be protected against rusting and zinc plating is the answer. The program is just getting under way and will call for the plating of millions and millions of these cartridge cases. Because of the cadmium shortage, zinc plating is replacing cadmium plating in many applications. The newer bright and smooth zinc plating baths are enabling the use of zinc plating for this purpose. Practically any item made of steel or brass, for war duty, is now being zinc plated. Except for certain bright plating solutions, the zinc plating bath is quite easy to control for good results. It should not be too hard, therefore, for an experienced plater to be placed in a war plant doing zinc plating.

This brief resume of the applications of plating to our war effort is intended to show the plater where his services are required. If you are a plater looking for war work, the first thing to do is to register at your nearest U. S. Employment Service Office. The next thing is — don't be afraid to convert yourself. Even if you have been gold plating jewelry or silver plating novelties all your life, there is no reason why you cannot learn to do zinc plating. If you have kept abreast of the plating field and understand the first principles well, you can succeed in any other plating field even though you lack specific experience with the metal. Take a job even as a helper, if need be, in the new field just to get the hang of it, and let the rest take care of itself— but get into the war effort. America can use every experienced plater!

## Federal Government Will Fill Technical and Scientific Aid Positions

Men and women are sought to fill positions as technical and scientific aids in the Federal Government. They are needed to do research and testing in the following fields: chemistry, geology, geophysics, mathematics, metallurgy, meteorology, physics, and radio. The positions pay $1,620 to $2,600, plus overtime.

Applicants may qualify through experience or education. For the assistant grade, applications will be accepted from persons who have completed one year of paid experience or a war training course approved by the U. S. Office of Education. One year of college study, including one course in the option applied for, is also qualifying. Persons now enrolled in war training or college courses may apply, subject to completion of the course. For the higher grades, successively greater amounts of education or experience are required.

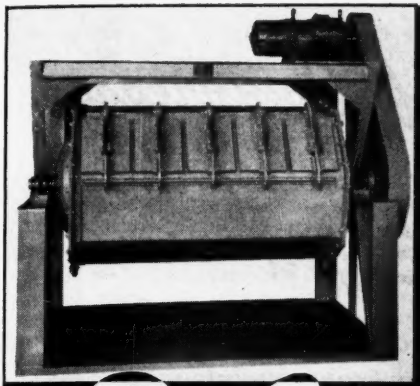
The majority of positions are in Washington, D. C., but some will be filled in other parts of the United States. There are no age limits, and no written test is required. Applications and complete information may be obtained from first- and second-class post offices, from civil service regional offices, and from the Commission in Washington, D. C. Applications will be accepted at the U. S. Civil Service Commission, Washington, D. C., until the needs at the service have been met.

Trainee positions in technical and scientific work will be filled in Washington, D. C., and vicinity. The salary is $1,440 a year plus overtime, and the only educational requirement is that the applicant must have completed one high school credit of physics, chemistry, mathematics, biology, or general science. There are no options.

Persons using their highest skills in war work are not encouraged to apply. War Manpower restrictions on Federal appointments are given in Form 3989, posted in first- and second-class post offices.

## 9,000 Bombers Lost

The above headline in a daily paper would shock all of us, but it is a fact that last year enough man-hours were lost on production lines because of accidents to build 9,000 heavy bombers. Be careful and you help the United Nations; careless and you help the Axis!



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PROPELLER BLADES
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ALUMINUM
CASTINGS
and Other War
Production Parts

# Proper Care of Compressed Air Plants Helps the War Effort

*A discussion of the many uses of compressed air equipment and the importance of its proper maintenance as a boon to production.*

THE equipment that goes to make up a complete compressed air system — namely, compressors, compressed air lines, intercoolers, aftercoolers, and receivers—needs constant care if the component parts are to perform their duties efficiently with the minimum of maintenance and service interruption, and thus keep our war industries operating at capacity. Small plants, as well as large plants, need persistent attention for best operation.

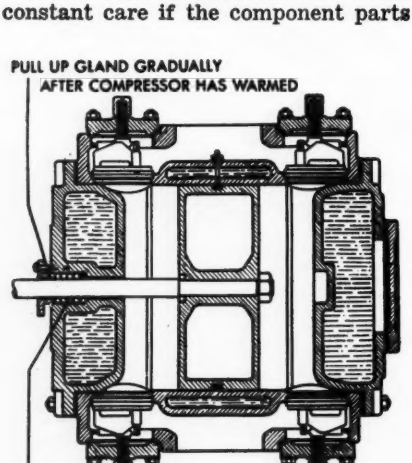


Fig. 1—The stuffing boxes should be packed carefully with the packing thoroughly soaked with oil. The gland should be pulled up gradually after the compressor has warmed up, and tightened just sufficiently to prevent blowby along the rod.

In the operation of compressed air equipment, it is important that the original installation is correctly made; that the compressors and pipelines are properly placed with respect to each other; that lubrication is carefully carried out, and that the whole unit is kept clean, protected from dust and dirt, and systematically inspected and maintained.

In starting a new reciprocating compressor or an old one that has not been in operation for some time, it is necessary to see that the crankcase is carefully cleaned of all grit and other foreign matter and filled to the proper level with suitable oil. The cylinder lubricators should likewise be flushed and filled with an oil suitable for cylinder lubrication.

The operator should be cautioned never to use kerosene, gasoline, or other light petroleum products in flushing out cylinders or compressor frames. They are volatile and danger-

ous to use! It is better to waste a little lube oil in the process. Care should also be taken not to use waste or rags which leave a lint deposit and may clog oil passages, and so on.

When mechanical lubricators are filled, it is good practice to break the oil line joints nearest the cylinder and crank the lubricators by hand until oil appears at the various joints. When this has been done, the operator can reconnect the piping with assurance that cylinders will be provided with oil immediately upon starting.

Packing of the stuffing boxes should be done carefully. Any packing used should be thoroughly coated with oil. If soft packing is to be employed, it should be soaked in oil over night so as to impregnate it as thoroughly as possible. The packing should not be pulled too tightly at the start, for this is liable to score the piston rods; rather, the gland may be pulled up gradually after the compressor has warmed up and tightened just sufficiently to prevent blowby along the rod. (See Fig. 1.)

Before starting the compressor, the operator should be absolutely certain that the intake line has been thoroughly blown out and cleaned of all dirt, welding shot, scale, and other foreign matter. Many new compressors have had the valves and cylinder walls badly damaged by sucking in such foreign matter.

The cooling water should then be turned on to make sure that there are no leaks in the water lines or in the cylinder packets and that there is no stoppage of water flow. Jacket lines should be so connected that the flow of water may be observed either into an open funnel on the discharge, or by means of sight pressure glasses if a closed system is used. (Fig. 2.) The circulating water lines from both cylinders and coolers should have drain valves at the lowest point to permit the entire system to be drained in cold weather if the equipment is shut down.

To make sure that all parts are clear before starting the compressor, the operator should turn the equip-

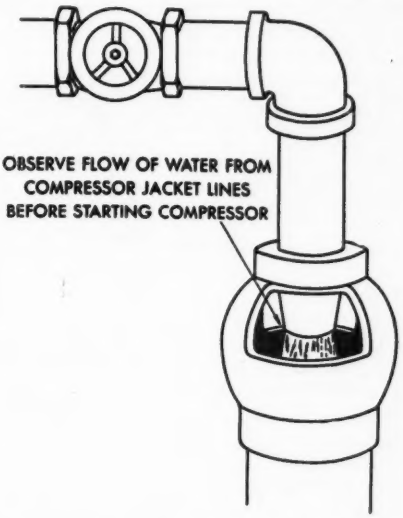


Fig. 2—It is important that the flow of water through jacket lines be observed. An open funnel as shown here or sight pressure glasses are recommended.

ment over several times by hand. To start the compressor, the power should be turned on gradually. During the first few hours, the operator should start and stop the machine intermittently, feeling the various bearings for excessive temperature. It is common practice to run in a new machine with the compressor valves removed in order that the equipment may be broken in gradually under no load. Make certain when starting up the compressor that all working parts requiring lubrication are getting plenty of oil and that no part is heating up. After several hours' operation in this manner, the valves may be replaced, making certain that the jam screws which hold the valves on their seats are screwed

down firmly. The machine may then be started with all the valves installed, being careful to build up the pressure slowly over a period of several hours.

If the source of power is steam, the drains on the steam cylinder and the steam pipe above the throttle must be opened before the compressor is started, to eliminate any condensation. The throttle valve should be open a very small amount before starting to permit a small amount of steam to pass into the steam cylinders to heat them gradually. After these cylinders are heated, the throttle valve may be opened sufficiently to permit the compressor to turn over slowly. If the compressor is of the single crank type, it may be necessary before starting to use a bar to move it off dead center.

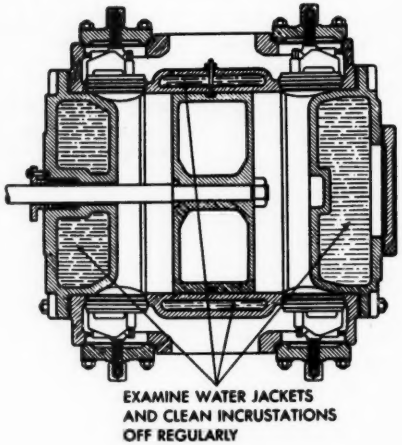


Fig. 3—Water jackets of compressors must be examined at frequent intervals and should be thoroughly cleaned regularly.

In the operation of air compressors, it is excellent practice to establish an engine room log requiring the recording of operating data at definite periods throughout the day; also, the log should record what routine daily inspections must be made, as well as what weekly and monthly inspections should be established. As an example, instead of running the compressor without shut-down until there is evidence of a broken part, the valves should be removed and carefully examined every six months (every two months if the equipment is in 24-hour daily use.)

If the equipment is operating properly, each valve should have an oily surface and be comparatively free from carbon. When reassembling the unit, the operator should be careful to keep each valve assembly together and not interchange parts. If any head gaskets are replaced, extra care should be taken to insure water ports being cut in the gaskets, which must correspond in size and location to the ports in the cylinders and the heads. Failure to do this causes overheating and possible serious damage.

At predetermined periods, the entire compressor should be carefully inspected for the presence of worn parts, packings which should be replaced, changing of oil in the crankcase, and inspection for complete overhaul of the equipment if it has had considerable usage. If the inspection system provides for definite routine inspection for every purpose, the equipment will be very much better maintained and cared for, with less interruption to service and lower cost of compressed air.

It is essential to examine the water jackets at frequent intervals and thoroughly clean them (Fig. 3). Their condition is the best evidence of the suitability of the cooling water that is used. The presence of heavy, hard scale in the jackets forms an insulation which prevents the effectiveness of the water jackets. The jackets can be cleaned either by a pressure jet of

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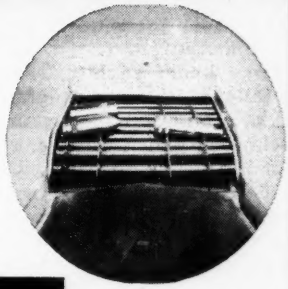

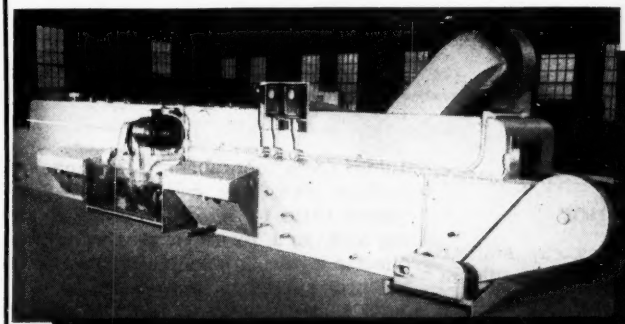

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water for any silt or other soft deposits, or by dilute acid if the scale is hard. The acid, 10 per cent hydrochloric (muriatic), may be forced through the jackets by a small circulating pump, or by running it from a container placed above the cylinders. It is important to neutralize the acid effect in the jackets with alkali after the acid treatment to avoid any damage being done.

In the operation of two-stage compressors, a disturbance of the normal intercooler pressure is one of the first indications of trouble. If the intercooler pressure rises, there may be something wrong in the high pressure cylinder, such as leaky or broken intake valves or a defective piston ring. If the intercooler pressure falls below normal, trouble may be looked for in the low pressure cylinder. Such a defect may also be observed by the overheating of either discharge or suction valves. If the valve covers are unusually hot, there is evidence of leakage, which may be either in the valve or a blown-out gasket between the valve and the cylinder. If there is a metallic knock in the compressor cylinder during each revolution, something is loose. The valve jam screw may not be holding the valve firmly against the cylinder, the pressure causing the valve seat to clatter against the cylinder; or the piston may be loose on the rod.

These are warnings which should be promptly investigated to head off any serious damage. For instance, if the jam screw is not down tight and allows the valve to pound up and down at every revolution, the valve seat may break, causing a broken part to fall into the cylinder. The machine may be very seriously damaged by such a broken part falling into the path of the piston. Most cases of broken valve seats are caused by the valve being loose, whereas such a condition always gives ample warning.

*(Courtesy The Compressed Air Institute)*

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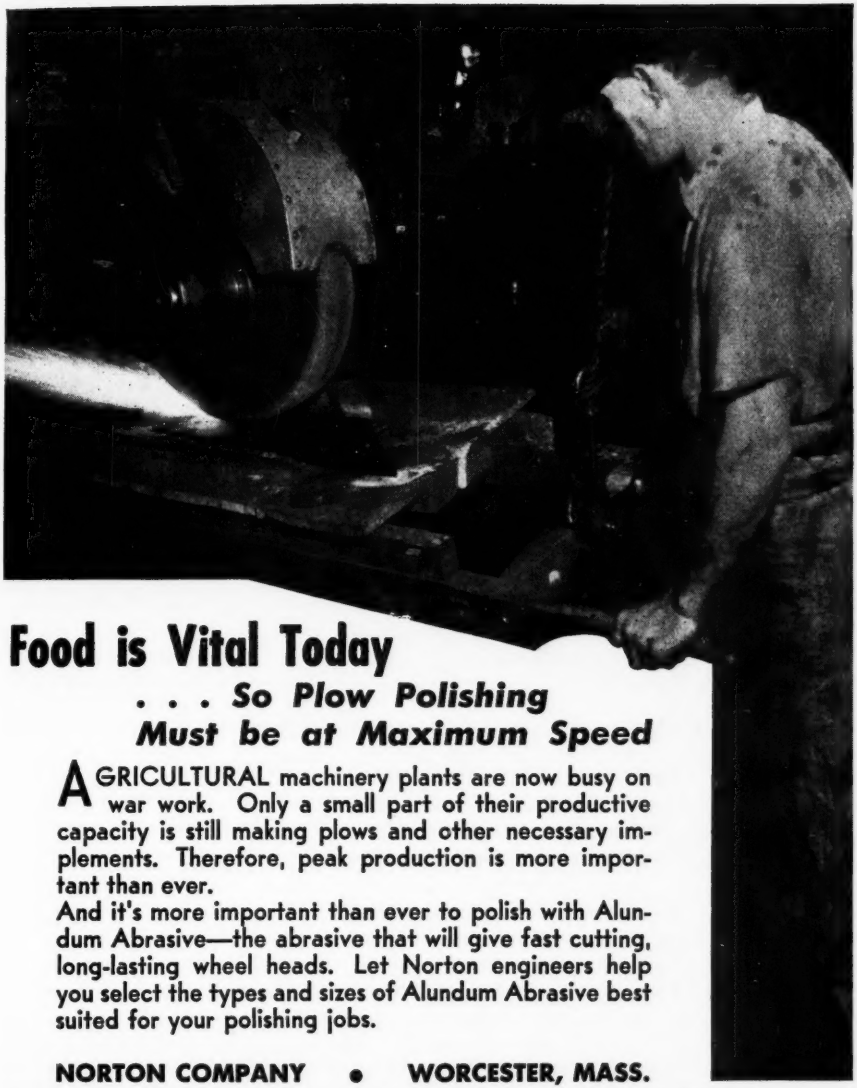

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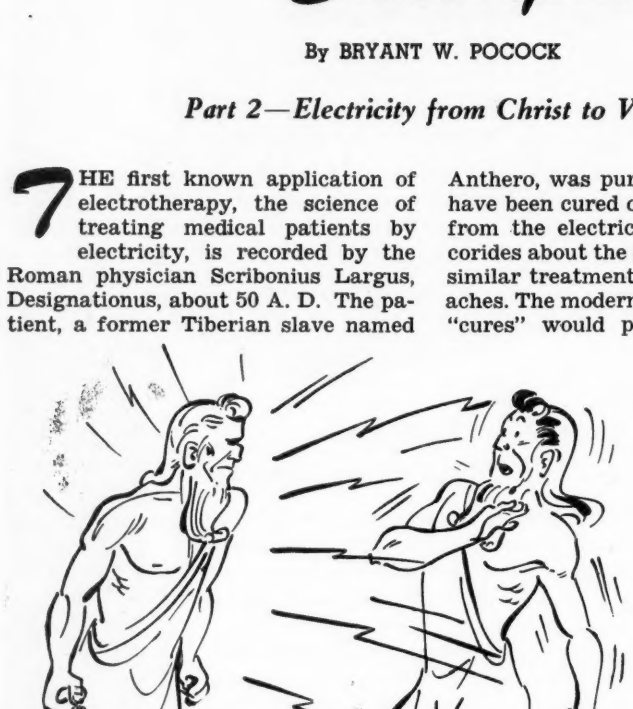
# The History of Electroplating

By BRYANT W. POCOCK

## *Part 2—Electricity from Christ to Volta*

THE first known application of electrotherapy, the science of treating medical patients by electricity, is recorded by the Roman physician Scribonius Largus, Designationus, about 50 A. D. The patient, a former Tiberian slave named Anthero, was purported by Largus to have been cured of the gout by shocks from the electric torpedo fish. Dioscorides about the same time prescribed similar treatment for persistent headaches. The modern explanation of these "cures" would probably involve the argument that something so drastic was substituted that the patients completely forgot their original ailments.



"It is probable that the Scandinavian deity Thor, the mythical Norse god of thunder—he who slew his enemies with bolts from his thunder hammer—was in reality a human 'spark plug' . . ."

St. Elmo's fire, although known to the ancient Greeks and described by Pliny in his "Natural History," was given its name from a corruption of the Italian "Sant' Ermo," referring to Saint Erasmus. Erasmus, a bishop of Formiae, Italy, during the reign of Domitian, was broken on the wheel at Gaeta on June 2, 304 A.D., as a Christian

martyr. St. Elmo's fire is actually a brush discharge of static electricity from pointed surfaces, usually accompanied by a crackling or fizzing sound As such it was observed by St. Erasmus and others on the masts of ships or at their yardarms or rigging. The phenomenon immediately acquired supernatural significance and was supposed occasionally to represent an evil omen luring the sailor to his death. On other occasions two such simultaneous fires were identified with Castor and Pollux, guiding the mariner safely to port.

The Greek alchemist and historian Count Zosimus in his history of the Greek empire recorded about 425 A. D. that metals immersed in solutions containing copper acquire a coating of copper. He is the first to call attention to this phenomenon and is thus the first investigator to observe anything approaching an example of the relative electromotive characteristics of metals.

Twenty-five years after Zosimus' observations, the Greek physician Aetius recommended that persons with gout or convulsions should hold a magnet in their hands. The magnet was supposed by many about this time and later to cure a variety of maladies. It was said when pulverized to heal burns, to cure dropsy, the toothache, hemorrhages, baldness, insomnia, and similar ailments.

It was pointed out by Eustathius, Archbishop of Thessalonica, in 1160 A. D. that Walimer, King of the Goths in Homer's *Iliad,* frequently gave off sparks from his body accompanied by crackling noises. The Roman emperor Servius Tullius is recorded to have emitted streams of fire from his hair during sleep, even at the age of seven. In an article entitled "Baby Lightning," Paul W. Kearney[3] lets us in on some interesting information regarding modern cases of this nature, referring to them as human spark plugs. These are persons who store up so much electricity in their bodies that they constitute potential hazards to themselves and to everyone else in their vicinity.

It is probable that the Scandinavian deity Thor, the mythical Norse god of thunder—he who slew his enemies with bolts from his thunder hammer—was in reality a human "spark plug" who frightened his antagonists out of their wits by building up enormous potentials of electricity in his body and discharging the sparks at them. His legendary father, one-eyed Odin of Valhalla, was undoubtedly another case of the same kind.

From 1160 to the time of the Swiss Paracelsus, Philippus Aureolus Theophrastus Bombast von Hohenheim (1490-1541), occurs a great gap in man's investigations of electric phenomena, only partially filled in by increasing use of the mariner's compass needle, which by these times had become well known. Paracelsus, whose very name of Bombast has come to signify one who is wont to discourse at great length upon practically any topic, did take the time between writing down his directions for the manufacture of homunculi and magic mirrors to record the observation that iron when dipped into the bluish copper-containing waters of Schmollnitz, Hungary, became coated with copper. Paracelsus, however, ascribed this to an actual transmutation of metals[4], a view which is not surprising, considering the extent to which his mind was influenced by research on black magic, devils, elixirs, essences, gnomes, spirits and the like.

In the year 1600 occurred the most remarkable and momentous event in the history of electricity up to that time, the publication in six books of

[3] Kearney, Paul W., "Baby Lightning," *National Safety News,* January, 1943.

[4] McMillan, Walter G., and Cooper, W. R., "Electro-Metallurgy," p. 2, Charles Griffin and Company, Limited, London, 1923.

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William Gilbert's monumental "De Magnete." As has already been mentioned[5], Gilbert was physician extraordinary to Queen Elizabeth and to James I of England. In his great work he applied insofar as was possible in his times the scientific attitude in his treatment of all that was then known of magnetism and electricity. His analytical and deductive reasoning was supported wherever possible by direct experimental proof, and his justly famous electrical encyclopedia, the compilation of which is said to have taken him seventeen years, is surprisingly devoid of references to the supernatural. Surprisingly, that is, for the age in which he lived.

"It is not difficult to presume that the poor fellow's hair probably turned white at the thought that he had hooked the Devil himself . . ."

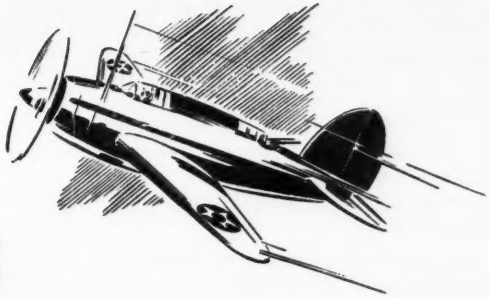
The second chapter of Book II of "De Magnete" is apparently the earliest publication ever to appear on electricity in general. In it, Gilbert lists the results of many of his experiments, describes an electroscope which he himself invented, lists a series of electric and non-electric materials and attempts to differentiate between magnetic and electric forces.

In 1817, J. B. J. Delambre, professor of astronomy at the Royal College of France, alluded to the seventeeth century superstitution of Mediterranean sailors that a compass needle will behave erratically when subjected to the emanations of the onion plant or when in the vicinity of onions. Whether these sailors knew their onions as well as modern sailors do has long since been decided in the negative.

The first frictional electric machine — that device which is so familiar to every high-school student of physics — was invented in 1660 by Otto von Guericke, mayor of Magdeburg, Saxony. This was the same fellow, it will be remembered, who ten years previously had constructed the famous Magdeburg hemispheres, which when exhausted of air could not be pulled apart by twelve teams of horses. With his so-called static machine von Guericke went to work on pith balls and discovered most of the laws relating to their mutual attraction and repulsion when charged with electricity.

One of the earliest types of electric light was discovered two years later by Prince Rupert of Bavaria in the form of his Rupert's drops. These are made by allowing drops of molten glass to fall into cold water, which of course immediately solidifies them. As, however, they solidify under considerable strain, if a small piece of the tip

[5] See Introduction.



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of one of them is broken off, it will fly apart suddenly into a white powder, accompanied by the emission of light. The main drawback to their practical utilization is the fact that several thousand would have to be broken simultaneously for even an instant of useful illumination, and the accompanying explosion would probably be catastrophic.

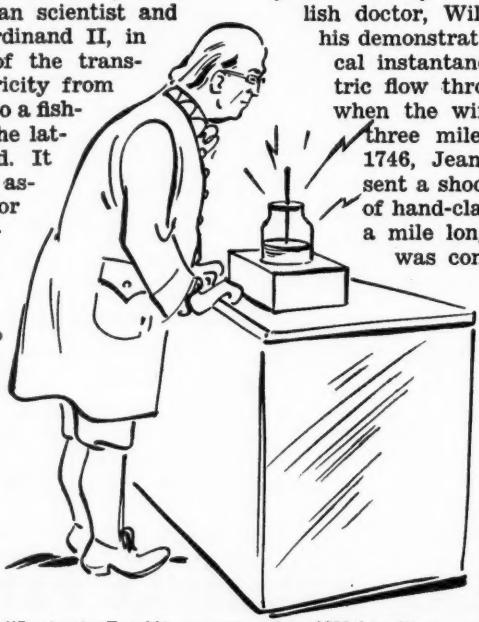
Sir Isaac Newton, one of England's greatest scientific minds of all time and the formulator of the laws of motion, communicated to the Royal Society in 1675 his discovery that glass when rubbed will attract light bodies. He improved von Guericke's electric machine and invented the concept of the "aether."

One of the greatest shocks which have ever been known to upset the frayed nerves of a tense and vigilant man was recorded in 1678 by Francesco Redi, Italian scientist and physician to Ferdinand II, in his description of the transmission of electricity from the *raia torpedo* to a fisherman through the latters' line and rod. It is not difficult to assume that the poor fellows' hair probably turned white at the thought that he had hooked the Devil himself.

Of interest to physiologists is the earliest known record of the effects of electricity on frogs' muscles. This is contained in a history of the French Academy of Sciences written by the great anatomist Joseph Guichard Duverney and published in 1700. Just a few weeks later the Italian physician Caldani wrote of his success in reviving frogs by means of electrical discharges.

Although the German physician Engelbrecht Kaempfer recorded in 1702 that an individual can avoid all untoward effects from a shock by the torpedo fish simply by holding his breath, and although this seemingly impossible fact has since been confirmed by others and is vouched for in the Transactions of the Philosophical Society, it is not to be recommended as a method whereby capital offenders may hope to escape the benefits of electrocution.

The Leyden jar, the world's first electric condenser, was independently invented in 1745 by Kleist, Musschenbroek and Cunaeus, and was used two years later by the celebrated English doctor, William Watson, in his demonstration of the practical instantaneousness of electric flow through wires, even when the wires were two to three miles in length. In 1746, Jean Antoine Nollet sent a shock through a line of hand-clasped monks over a mile long. Moreover, it was considered of great significance that they all yelled at the same time, demonstrating beyond doubt the rapidity of electric flow.



"Benjamin Franklin announced in 1752 his discovery of the identity of lighting with the sparks from a Leyden jar . . ."

Benjamin Franklin announced in 1752 his discovery of the identity of lightning with the sparks from a Leyden jar, hence with

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electricity. Professor George William Richmann of the St. Petersburg Imperial Academy attempted to repeat Franklin's experiment on August 6, 1753, but met instead with instant electrocution. In spite of these facts, it was not until 1769 that St. Paul's Cathedral in London was provided with lightning conductors. It is very possible that after Richmann's untimely death it took sixteen years before anybody had worked up enough courage to install them. Benjamin Franklin[6] later made the astute remark that it was a pity George III saw fit to erect lightning rods on Buckingham Palace.

The electrophorus was invented and given to the world in 1775 by Alessandro Volta, a professor at the University of Pavia, Italy. Volta invented an improved type of electric condenser in 1782 and devoted the remainder of his life to the planning and execution of experiments on electricity which were of such importance that the unit of electromotive force was named the volt in his honor. His crowning achievement was announced in 1800 and consisted of the Voltaic Pile. This first electric battery was made of a series of alternate copper and zinc plates, separated by moist cloth. Volta subsequently improved his pile by the addition of salt water, and made available a source of electric current the strength of which could be controlled, and the uses of which were destined to become many.

[6] Benjamin, Park, "The Age of Electricity," p. 26, Charles Scribner's Sons, New York, 1889.

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In addition to complete information on those Birdseye lamps standardized for government use on the 1943 contract, the schedule describes two lamp products to fill specific wartime problems—the Superlite light conditioning bulb for use without fixtures, globes, shades, and so on, where such equipment cannot be obtained, and the Birdseye infrared heat lamps for speeding up wartime production in industrial baking, drying and dehydrating.

Government procurement agencies, purchasing personnel and lighting engineers can obtain copies by writing to Birdseye Electric Corporation, Brooklyn, New York.

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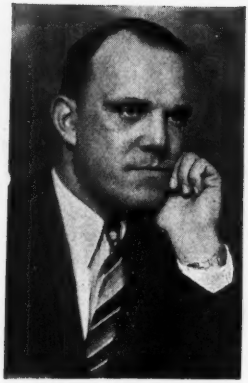


JEFFREY R. STEWART

# Wrinkle Finishes --What You Should Know

PART 3

By JEFFREY R. STEWART
Analytical and Consulting Chemist

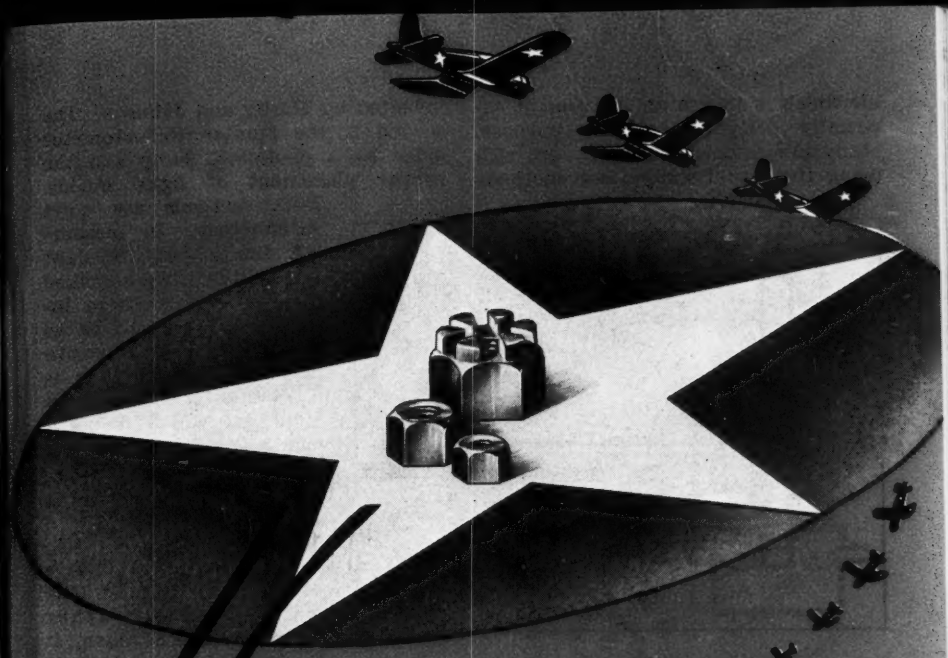
## *The Blackness of Black Wrinkle Finishes*

ALTHOUGH wrinkle finishes are available in practically all the popular colors, the black finishes are consumed, by far, in the greatest quantities. Since it is estimated that over 85 per cent of all wrinkle finishes are produced in black, rather than colors, it is important that we know something about the quality of the black . . . or shall we call it the "blackness of the black."

To the average layman, it is generally assumed that if a protective coating is black, that is as far as it goes, and that different blacks will all be approximately the same. This is not true, as many of us have discovered. Samples of blacks from different manufacturers often display varied hues*. For instance, a wrinkle finish pigmented with the aid of a carbon black of high color intensity will produce a finished product of considerably greater blackness than when a blue-grey carbon black is used. The difference, however, cannot be observed very readily unless the dried samples are placed adjacent to each other.

The differences in the various hues of black coatings was very effectively displayed a few years ago in a brochure distributed by the Interchemical Corporation. In this little publication, the optical effects and comparisons were vividly demonstrated, not only from a standpoint of the hues of different blacks, but also the effect of gloss on the apparent blackness of black coatings. Most of us realize, although in an unconscious way, that a black enamel with a high gloss always appears to be blacker (or some use the term "more jet") than one with less gloss or a flat finish. This may or may not be true. Fundamentally, the best way to determine the blackness of a black wrin-

*Definition of hue: A term used to distinguish one color from another, such as red, green, blue, and so on. It is also the effect resulting from the admixture of a small proportion of one color with another, which is known as an intermediate. This is only one of the attributes of color. Do not confuse "hue" with "chroma," the latter being the color intensity or purity of tone or the degree of freedom from grey.



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## AIRCRAFT NUTS CLEANED BETTER AT HALF THE COST WITH PENNSALT CLEANER

A New England manufacturer of parts for aircraft had a real problem in getting nuts free of oil and chips. The washing machine in use was of the rotary type with scoop action. A solvent cleaner was being used but it did not get the nut threads clean of very small chips. When the Penn Salt technician called, the manufacturer was trying another type of metal cleaner in connection with the solvent, but it showed no improvement.

The first Pennsalt product recommended did a thorough cleaning job, removing both the oil and the chips. After a long period of continuous operation, cleaning results were still excellent and a comparison of costs showed a saving of 50% in favor of the Pennsalt cleaner.

It is possible that one of this famous family of cleaners can do as well—or better—for you. Our technical representatives will be glad to cooperate with you on any cleaning problem which you may have. No obligation whatever—and you will get the benefit of experience that covers the entire cleaning field. Write fully to Dept. PF.

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MANUFACTURING COMPANY
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kle finish is to use an instrument especially designed for the purpose. Many laboratories, however, are still using the visual comparison methods against established standards in which the human eye is the measuring medium.

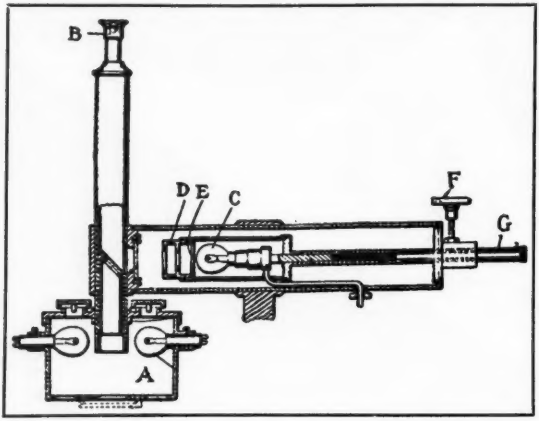



Fig. 1—The Nigrometer shown herewith is a device which can be used satisfactorily to measure the blackness of black wrinkle finishes, providing certain precautions are observed.

## How the Blackness of Black Wrinkle Finishes Can Be Measured Quantitatively

The writer has been called upon during the past few years to recommend some system or method to record blackness in terms of some numerical value in order that such information could be inserted into specifications. So far as he knows, there are only two satisfactory instruments for measuring blackness*. The first is known as the Nigrometer, which was invented by Hardy and Johnson. The second is the Hunter Reflectometer aided by a photoflood lamp and the proper placement of light shields. Both methods are quite satisfactory. In measuring the amount of light reflected by these so-called black surfaces, these instruments have to be so designed that an intensive degree of illumination is available; a housing is employed which is sufficiently light-proof to prevent the entrance of extraneous light. Both of these instruments meet this requirement.

Since wrinkle finishes present a characteristic patterned effect rather than a smooth finish, it is desirable to select as large an area as possible. You will recall that last month we discussed the measurement of the gloss of wrinkle finishes. The statements made dith reference to that subject may likewise be applied to the measurement of blackness of blacks. Figures 1 and 2 present diagrams of the mechanical arrangement of the parts of two popular instruments for measuring blackness.

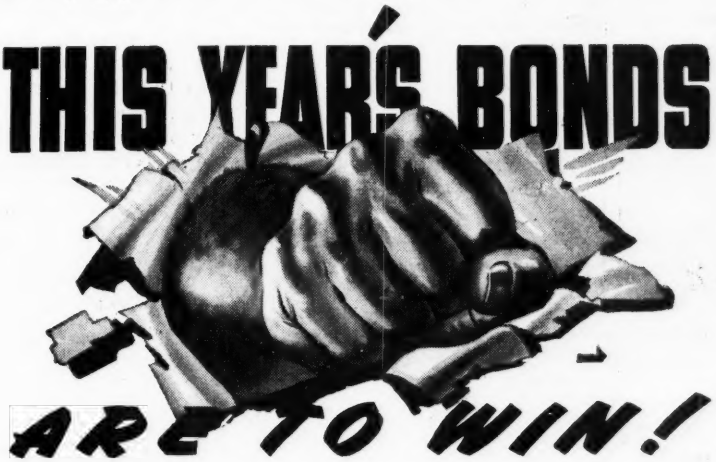
## Producing Wrinkle Finishes Without Chinawood Oil or Oiticica Oil

The War Production Board has recently banned or refused to allocate Chinawood oil (same as tung oil) and oiticica oil for use in wrinkle finishes. The only exception to this case is in the production of finishes used in aircraft and Signal Corps communication equipment. All other Army and Navy specifications dealing with wrinkle finishes require that the products supplied shall be free of Chinawood oil. In spite of this drastic action, huge quantities of wrinkle finishes are

* The most fundamentally accurate device for making such determinations is known as the General Electric Spectrophotometer which is sometimes called the Hardy Spectrophotometer. This instrument was discussed in detail in the April, 1943, issue of PRODUCTS FINISHING in an article by A. G. Mezerik. However, this instrument is used only by the larger organizations due to its extremely high cost.

## LAST YEAR'S BONDS GOT US STARTED

# THIS YEAR'S BONDS



# ARE TO WIN!

★ Last year nearly 30,000,000 workers were buying War Bonds through 175,000 Pay-Roll Savings Plans. At an average rate of practically 10% of gross pay!

This year we've got to top *all* these figures—and top them handsomely!

"But," you say, "there's a Pay-Roll Savings Plan already running in my plant."

*Sure, there is*—but how long since you've done anything about it? Check up on it today. If it doesn't show substantially more than 10%, it needs a thorough re-canvass!

*And you're the man to start it!* Organize a vigorous drive. Other plants are boosting their quotas to 12% and 14% of pay-roll. You can do as well, or better.

In plant after plant, the Pay-Roll Savings Plan gives labor and management a common goal. Company spirit soars. Production swings up.

War Bonds help win the war, and close the inflationary gap. They keep on working when victory comes . . . build an invaluable reservoir of purchasing power to help American business re-establish itself. You help your nation, you help your workers, and you also help yourself. Get started today!

## You've done your bit Now do your best!

THIS SPACE IS A CONTRIBUTION TO AMERICA'S ALL-OUT WAR EFFORT BY

PRODUCTS FINISHING

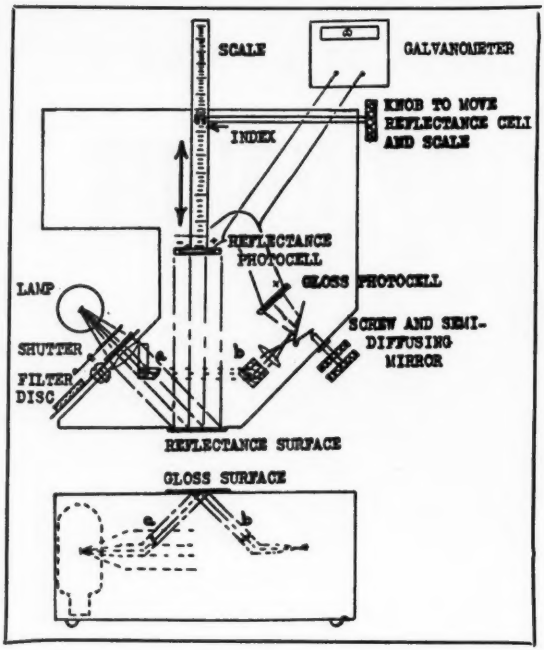



Fig. 2—The diagram shows the mechanical arrangement of the Hunter Reflectometer, an instrument which can be modified to measure the blackness of black wrinkle finishes.

still being made—only, of course, with substitutes.

At the time of this writing (April, 1943) the substitute materials have not always been as satisfactory as Chinawood oil. Most of the difficulties, however, have been eliminated and within a few months we should be free of the difficulties caused by the change over to wrinkle finishes made with linseed oil. Manufacturers of wrinkle finishes are beginning to learn that the special linseed oils appear to be well adapted for wrinkle formulation.

American ingenuity, then, can be given the credit for the fact that within a relatively short time we have been able to produce satisfactory wrinkle coating composition from non-critical war materials. However, there is no use trying to fool ourselves into believing that all difficulties have been eliminated. Moreover, we are not without the realization that these new products are not identical with nor possess all the desirable characteristics of wrinkle finishes which were previously made with Chinawood oil, oiticica oil or dehydrated castor oil. For instance, it has been found that the baking schedule may have to be revised and special conditions or modifications maintained in the formulation of the substituted product.

It has been found that the wrinkles produced by linseed oil are somewhat more glossy in appearance than those obtained by the use of the other three vegetable oils previously mentioned. This, however, is not a serious detrimental factor, although it does introduce another factor for the consideration of the producer, consumer and writer of specifications.

Although the information has not yet been officially released, it can be expected that several new substitutes for Chinawood oil will be forthcoming during the summer and fall months of 1943. Practically all the producers of vegetable oils are working on this problem now or have already concluded the developmental stages for satisfactory substitutes. We can look forward to some interesting new products. We will discuss in greater detail the new wrinkle finishes made from linseed oil in a subsequent section of this series. It is rather early to give

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# *Filtering Solutions IS Necessary!*

## Use SPARKLER HORIZONTAL PLATE FILTERS

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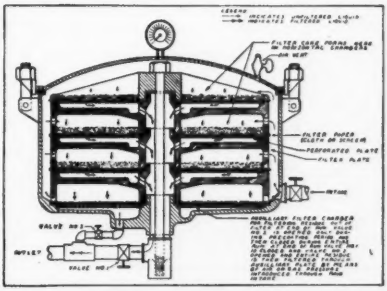
Why not do it efficiently with a minimum of cleaning time?
Ample cake space provided in a Sparkler.

Sparkler Filters use all filter aids — diatomaceous earths, filter papers and filter cloths—to equal advantage. Simple to clean and change.

***Write for free engineering service and filter test.***



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**254 LAKE STREET**
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WITH THE HORIZONTAL PLATES

any definite or extensive information at this time.

## The Significance of the Film Thickness of Wrinkle Finishes

The thickness of the applied wrinkle finish is rather important because it governs so many other factors. Needless to say, it would be poor economics to apply a spray coating of 0.006 inch when a thickness of 0.004 inch would produce the desired effect. The gallonage consumption in such a case would be about 50 per cent greater. In this respect, the term "mileage" is frequently used. This word is really nothing but a term used by the spray mechanic for spreading rate, or the number of square feet of surface which can be covered with one gallon of wrinkle finish.

The mileage can be measured in two ways. Theoretically, it can be determined by measuring the thickness of the film with the aid of an instrument like the Pfund Film Thickness Gage shown in Fig. 3. The practical spray mechanic, however, often prefers to obtain this information merely by measuring the amount of area that can be covered by a unit quantity of material.

Both methods are satisfactory, except that the latter does not give a quick reading of the film thickness without calculations. For this reason, the writer has used the Pfund device for the last ten years. Values obtained with this instrument are very informative because they can be used as a quick method to determine if any difficulties are caused by applying too thick or too thin a film with the spray gun. Since the human element enters into the application of wrinkle finishes with the spray gun, it is often desirable to know whether the spray mechanic is applying the optimum amount of the coating. It is desirable, therefore, to have a film thickness gage available either of the Pfund type or one which is equally satisfactory.

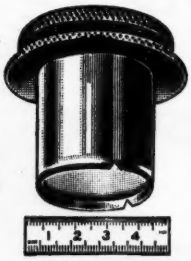


Fig. 3—The film thickness of wrinkle finishes can be measured in terms of millimeters through the use of the Pfund Film Thickness Gage illustrated herewith.

Most of the film thickness gages on the market are inexpensive, simple to operate and give very quick results. Most of the manufacturers of film thickness gages supply complete information regarding their use and supplement the instructions with charts which permit the user to make a rapid conversion from the thickness in millimeters to the spreading rate in square feet per gallon.

In order that we can understand the practical significance of film thickness, let us observe some of the specifications. In some regulations, we find that thicknesses from 0.003 inch all the way up to 0.006 inch are permitted. Most specifications, however, allow a tolerance of plus or minus 0.001 inch after establishing what the optimum thickness would be for any particular material. For instance, if it had been found that 0.005 inch was the most desirable film thickness for

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**—as a surface tension lowering agent**
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For nearly forty years we have been producers and refiners of abrasive grains, serving the industry with a strictly quality product for all particular abrasive applications.
Accurately Graded — Thoroughly Cleaned — Greater Capillarity — Longer Wear.

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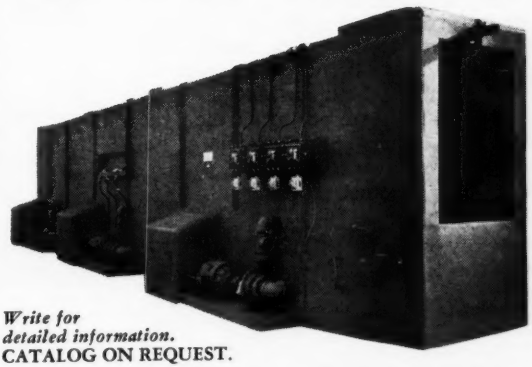
HOWARD Engineering has repeatedly solved the tough cleaning problems of a great motor firm — this time in an aircraft engine division—demonstrating again HOWARD versatility. There is a HOWARD machine—standard or special —for all types of metal cleaning and finishing.

*Of unusual size, this HOWARD monorail wash and double-rinse machine is 44 ft. long, 11 ft. high, 9 ft. wide. Cleans large sub-assemblies up to 4 ft. wide by 6 ft. high, on monorail; smaller parts in baskets. Features explosion-proof switches and motors and built-in fire protection equipment.*



*Write for detailed information.*
CATALOG ON REQUEST.

**HOWARD ENGINEERING & MFG. CO.**

**1056 Hulbert** **Cincinnati, Ohio**

a new product appearing on the market, then a reading anywhere between 0.004 and 0.006 inch would be satisfactory.

The study and control of the film thickness is of considerable value in "trouble-shooting" cases. For instance, if excessive sagging or runs are being observed, this condition can usually be eliminated by reducing the film thickness. Likewise "pine-treeing"* difficulties can usually be traced to a film with an excessive thickness.

You will remember that we previously discussed the effect of viscosity and film thickness on the appearance of the finished film, especially insofar as film texture and gloss were concerned. These four factors (viscosity, film thickness, gloss and film texture) are all interrelated. The first three of these four can all be measured by some definite system giving numerical values, but the last (film texture) can only be measured by optical observation and can only be permanently recorded by photographic means.

What is most important, however, is the fact that film texture can be effectively controlled by adjustment of the film thickness and to a lesser extent by regulating the viscosity of the material before it leaves the spray gun. Of all these four factors, however, film thickness is probably one of the most important, since the control of it can be the means of securing several other desirable properties of the finished wrinkled film.

In conclusion, therefore, we can generally state that the thinner the film, the less will be the tendency to secure the desired gloss; conversely, thicker films will give a high gloss. Thin films, as previously shown, exhibit a finer texture than thicker films. In obtaining thinner or thicker films, the viscosity of the material is of the greatest value, although it is difficult to establish any definite relationship between the viscosity of the material and the resultant thickness of the coating. This is due to the fact that there are other interfering factors involved, such as the individual technique of the spray mechanic, the pressure employed in the spray gun, the amount of thinner which has been added, and many other minor conditions.

*(To be continued next month)*

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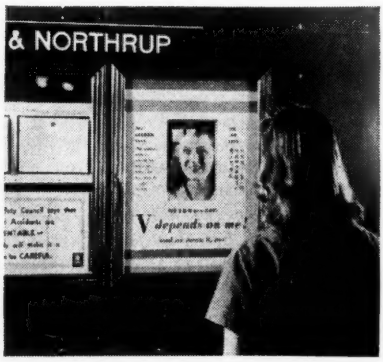
* Pine-treeing is defined in the addenda to the second edition of the "National Paint Dictionary" as a type of sagging of coatings, usually caused by application of an excessively heavy film. It is called "pine-treeing" because the sags or runs resemble small pine trees in shape.

## Mirror Reflects Meaning of Plant's War Slogan

To emphasize the meaning of its slogan — "V" Depends On Me! — Leeds & Northrup Company, 4934 Stenton Ave., Philadelphia, Pa., manufacturers of electrical measuring instruments and




heat-treating furnaces, displayed mirror posters on the bulletin boards of its plant. Standing before the red, white and blue poster, one employee after another saw his or her face in the mirror above the slogan, "V" Depends On Me! The mirror attracted, and the true meaning of the slogan registered.

*The many departments of the U. S. Government all accept*

# BLACK-MAGIC

## *"THE ONE-BATH PROCESS"*

on all contracts requiring a black oxide finish.

Save equipment, time and money by installing BLACK-MAGIC. Save 60% on operation by using the outstanding *one-bath* process . . . BLACK-MAGIC.

For better rust resistance use "WITCH-DIP," the wax base final finish.

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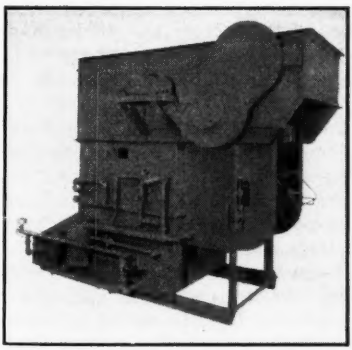
# TAKE THE SLOW SIGN *OFF* YOUR PRODUCTION LINE



***Illustrated is an automatic degreaser for 20, 37 and 40 MM projectiles and fuse parts.***

**Costly time consuming hand operations can be eliminated in your production work by the use of the overhead monorail type conveyor and Blakeslee Metal Parts Washing Equipment. You can take the SLOW sign off your production line and speed up machining and finishing operations by quickly and thoroughly cleaning stampings, castings, metal assemblies and all screw machine products with Blakeslee engineered-for-you equipment. Write today for full details on Blakeslee's Metal Parts Washing Machines and Solvent Degreasing Equipment. *Write or wire for rush quotations on any war defense contract requirements.***

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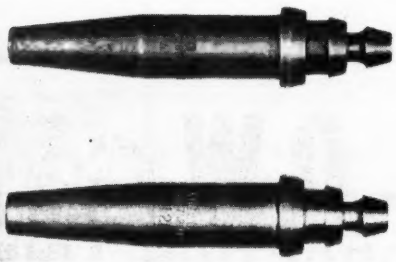
# Finishing Facts

## Cleaning and Maintenance of Gas Welding and Flame Cutting Tips

OXY-ACETYLENE welding and flame cutting methods have been extremely valuable in fabricating many different types of war products, ranging from demolition bombs to



Upper Tip Shows Condition Before Cleaning; Lower Tip, After Cleaning

General Sherman tanks. One of the principal reasons lies in the advanced design and precise construction of oxy-acetylene regulators, valves, torches, tips, and so on. Regular, thorough maintenance, therefore, is required to keep this vital equipment in effective operating condition.

A time-saving method for maintaining brass or copper gas welding and flame cutting tips has recently been devised and should prove of interest to readers of PRODUCTS FINISHING. After a period of normal use, tips acquire a deposit of carbon, slag, scale and tarnish. Orifices become congested or clogged, a condition which usually prevents utilization of correct pressures. When operating efficiency is thus affected, often gas is wasted. Obviously, it pays to keep tips clean. What, then, is the best way to handle this work on a fast production and safe basis? The experience of one metal-working concern points the way and may serve as a guide to others, particularly to those plants where a large amount of welding and cutting is done and where tips are reconditioned or handled on a daily basis.

The usual method for handling this work is to employ drills to open and clean orifices so that the oxygen stream has clean passage; then buff and scrape the surfaces of tips to remove traces of carbon, scale and tarnish. In one instance where a large volume of this work has to be handled, it has usually required the time of four workers for seven hours to clean 200 tips.

With the new time-saving method, it is reported that 500 tips are cleaned in three hours which cuts in half the time previously required for this work and more than doubles tip output. Quite important is the fact that the new technique now employed only requires the time of one individual, thus releasing the others for different work. Sequence of steps is as follows:

Tips are placed in basket and im-

mersed in a boiling cleaning solution for from 45 minutes to one hour, followed by cold rinse. Next, tips are immersed in solution of Oakite Compound No. 32 to remove carbon, slag and scale deposits, followed by cold rinse. Tips then are given a 10-minute bright dip, followed by cold rinse and boiling rinse to dry down with final air blow. This sequence of operations takes approximately 90 minutes, after which tips are free of deposits that upset flame balance. Possibility of mechanical injury to tips such as may occur by using wire cleaners or drills is avoided and tips come out of the solution clean, bright, looking like new inside and out.

Any munitions plant, tank arsenal or aviation plant using a large quantity of welding and cutting tips may find this method not only a great time saver, but also a contributing factor in the conservation of tips, the demands for which are placing increasing strain on replacements. Complete details concerning the method described and materials used are incorporated in a Special Service Report that may be obtained without obligation from Oakite Products, Inc., 20 Thames Street, New York City.

## Color and Heat

COLORS absorb and reflect heat rays as well as light rays. For this reason they are practical and efficient "insulators" to control temperature and minimize the evaporation of certain liquids.

According to data assembled by the Color Research Laboratory of the Eagle Printing Ink Company, Division of General Printing Ink Corporation, New York, N. Y., white is the best color to repel heat and black, the poorest. The hold of a white ship in the tropics will be at least 10 degrees cooler than the hold of a black ship. Why, therefore, shouldn't the manufacturers of countless products take advantage of this magic?

In a study of gasoline storage tanks, the U. S. Bureau of Mines found that a red tank had an evaporation loss of 3.54 per cent (over four and one-half months) as against 1.4 per cent for white. Home radiators in white and light colors also were found to be about 17 per cent more efficient than those painted black or bronze. Light colors on factory walls, on gasoline and benzine cans, on surfaces exposed to high temperatures seem logical indeed, and perhaps wise in economy and the reduction of certain hazards.

## Health Hazard

IN 1938 the plating industry was warned by the Department of Health of the City of New York of the health hazard involved in the use of cadmium, lead or other deleterious metals, wholly or in part, for plating refrigerators, utensils or apparatus which might come in contact with food or drink.

The investigation of several food poisoning outbreaks in New York City in 1942 disclosed that the food consumed had been contaminated with cadmium from the plating of evaporators of mechanical refrigerators, despite the fact that the food was not in direct contact with the cadmium plated fixture.

In one case, the ice cubes in the trays were contaminated with cadmium that had scaled off the evaporator. In the other instance, the cadmium had been dissolved and the resulting solution dripped into the trays. The ice cubes were used in cooling beverages, resulting in the ingestion of cadmium that caused immediate illness. Subsequent surveys conducted by the New York City Health Department revealed that many re-

frigerator evaporators and shelves, broiler grids for gas stoves and other food utensils and equipment are being plated with cadmium.

It is essential that all persons engaged in the business of plating, selling, manufacturing or distributing utensils and equipment which may come directly or indirectly in contact with food or drink be again warned concerning the hazard to public health involved in the use of deleterious metals in this connection. The Sanitary Code of the City of New York definitely prohibits the use of cadmium, lead or other deleterious metals in the construction of food equipment or utensils.

It is equally important that before replating any food utensils or equipment already coated with cadmium, that the cadmium be thoroughly removed. A field test for the rapid detection of cadmium which is easily performed is available upon request at the office of the Bureau of Food and Drugs, Department of Health of the City of New York.

## Sources Sought for Rare Chemicals

THE National Registry of Rare Chemicals is at the present time seeking sources of supply for the following:

1. Any tetrahydro iso-quinoline acid
2. Any alkyl phenanthrene ketone
3. Any alkyl tetrahydro phenanthrene ketone
4. 1—tetraanthrone (1 keto tetrahydro phenanthrene)
5. 4—tetraanthrone (4 keto tetrahydro phenanthrene)
6. Magnesium carbide
7. Magnesium nitride
8. Thiolactic acid
9. n-methyl glucylamine
10. Nitro starch

Anyone knowing where the above chemicals can be obtained will perform a definite service by informing Dr. Martin H. Heeren, Chairman, Chemical Engineering Research, Armour Research Foundation, 33rd, Federal and Dearborn Sts., Chicago, Ill. The Registry is maintained without charge as a service to industry.

## Glass Plate Guards Eyes

Safety devices played an important role in helping to cut the accident rate 50 per cent during the first half of 1942 at the Westinghouse East Pittsburgh Works, despite a 21 per cent increase in employment. One safeguard which has proved valuable is this glass guard installed over the air blower to protect the workman's eyes from flying metal chips at a Westinghouse war plant producing tank equipment. Air under pressure is used to clean the metal frame of scraps and chips after it has been machined.

# Paint Adhesion
## WITHOUT ANODIZING

TURCO

### Phosphatizing With
### TURCO W.O. #1

Try this quick, low-cost method of obtaining adhesion for paints on metals. Turco Phosphatizing with W. O. #1 produces a passive, slightly porous surface which is non-reactive to moisture and makes a thoroughly satisfactory base under all land conditions. It is harmless to metals, rubber or glass.

This is the ideal method for treating sheets and large assemblies. It may be applied by immersion, swabbing or spraying and acts as a cleaning agent when used.

No special equipment required for this cheap and speedy process. 54-53

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***WASHING***
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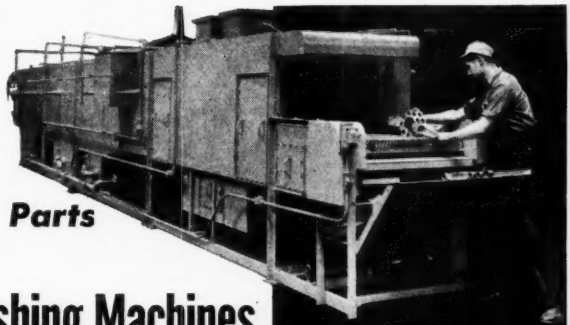


# INDUSTRIAL Washing Machines

Operator at right places engine parts on conveyor which passes through 2 washes, a rinse, a final filter rinse and a cold blow-off and dryer. Cleaned and dried parts are taken off at left.
Machine is composed of standard units, complete with explosion-proof electric equipment and $CO_2$ fire protection system.

We can design and build a washing and drying system for your product. Write or wire for our recommendations.

## INDUSTRIAL Washing Machine Corp.

**291 BURNET ST.** **NEW BRUNSWICK, N. J.**

# News OF THE INDUSTRY

## N. E. Regional A.E.S. Meeting

A well-planned educational program was arranged for the New England Regional Meeting which was held on May 1st at the Bond Hotel, Hartford, Conn., under the auspices of the Hartford Branch of the American Electroplaters' Society. The program was as follows:

**Afternoon Session—Metal Finishing Clinic**

Moderators:
Walter Meyer, Enthone Company
Chick Helmle, General Electric Company

Talk by Arthur Zavarella, Materials Engineer, Springfield Armory, Springfield, Mass.

Subject:
Ordnance Finishing of Small Arms

**Clinic Experts**

1. Henry Strow—Zinc and Cadmium—MacDermid, Inc.
2. Frank Mesle—Silver—Oneida, Ltd.
3. Ted Wieczorek — Phosphate Coatings—Stanley Works
4. Gene Worden—Iron Plating—Stanley Works
5. Harry Mahlstedt — Hard Chrome — United Chromium
6. Derick Hartshorn—Black Finishes—Enthone Company
7. John R. Thomas—Anodizing—United Aircraft
8. Dr. H. Kellner—Burring—Lea Mfg. Company
9. Howard Donahue—Barrel Finishing Abbott Ball
10. G. R. Watkins—Lacquers—Zapon
11. Harry Sanders—Finishing Uniform Hardware—North & Judd
12. George Hogaboom — News from Washington—W.P.B.

Ladies' Program:
Chairman, Mrs. Howard Donahue

Banquet: 7:00 P. M.
Speaker: U. S. Senator John Danaher from Connecticut

Special entertainment and dancing followed the dinner and the speech by Senator Danaher. Arthur W. Logozzo was general chairman of the meeting.

## Additional Quarters for New Wrinkle Laboratory

New Wrinkle, Inc., Dayton, Ohio, has announced the removal of their research and development laboratories to new quarters adjoining their general offices at 314 W. First St., Dayton, Ohio. The change has been necessitated to accommodate an enlarged staff and research facilities.

It is reported that the new laboratory, when completed, will include highly specialized equipment for the application of high-pressure and high-vacuum techniques.

## Additions to Wheelco Staff

Three additions to the sales and service staff of Wheelco Instruments Co., Chicago, Ill., have been announced by R. A. Schoenfeld, vice president and sales manager. Hugh Acock, formerly in the Tulsa territory, has been named Texas district manager with headquarters in Houston. C. H. Garrison has been named Kansas City representative, with a territory including western counties of Missouri. Russell George has been added to the sales and service department of the company's Combustion Safeguard Division with headquarters in Chicago.

## Staff Additions Announced by Quaker Chemical

Quaker Chemical Products Corporation, Conshohocken, Pa., announces several recent additions to the organization. Tulio Cordero, a graduate of the University of Cincinnati and the George Washington University — formerly connected with the United Drug Co. in Boston—has been added to the research laboratory staff. Another addition to the research laboratory staff is Dr. Boris Schwartz, who received his Ph.D. in organic chemistry from Rutgers University last year.

D. W. Prichard, who holds a B.S. degree in chemistry from Pennsylvania State College and was formerly associated with W. H. & L. D. Betz of Philadelphia, consulting chemical engineers, has joined Quaker's technical sales division.

## 31st Annual Convention of American Electroplaters' Society

The program which has been planned for the 31st Annual Convention of the American Electroplaters' Society comprises a pre-view of plating developments both during the war and after the war. The dates for the convention are June 7, 8 and 9, 1943, and the place is the Hotel Statler, Buffalo, New York.

Six educational sessions at which 26 vital technical papers will be given by outstanding authorities are included. A partial list of the topics and speakers is given below:

Electroplating and Government Restrictions: W. W. McCord, War Production Board

Military Applications: William Blum, Bureau of Standards

Effects of Various Anions in Metal Cleaners: E. C. Rinker, Oakite Products, Inc.

Modern Degreasers: F. Dammers, G. S. Blakeslee & Co.

Blackening of Ferrous and Non-Ferrous Metals: Dr. Walter Meyer, The Enthone Company

Industrial Salvage by Electrodeposition: O. G. Hogaboom, New Britain Machine Company

Cronak Process: E. A. Anderson, New Jersey Zinc Company

Electroplating's Future: E. W. Cochran, National Cash Register Company

Infra-Red in War-Time: W. S. Crandall, The Fostoria Pressed Steel Co.

Plating Cutting Tools: A. F. Fletcher, Brewer-Titchener Corporation

Racking in Hard Chrome Plating: A. W. Logozzo, Hartford Chrome Corporation

Burring: H. L. Kellner, The Lea Manufacturing Company

Controlling Solutions with Hull Cell: F. MacIntyre, E. I. du Pont de Nemours & Company

## Alfred E. Heroux of Aluminum Industries Dies

Alfred E. Heroux, sales manager of the Paint Division of Aluminum Industries, Inc., Cincinnati, Ohio, died of a heart ailment on Sunday, March 7th, after a lingering illness extending over several months.

Mr. Heroux joined Aluminum Industries as a member of the Detroit office in June, 1933. In September, 1935, he was transferred to Cincinnati as sales manager of the company's Paint Division. He served in this office until his death. Prior to his affiliation with Aluminum Industries, Mr. Heroux was associated with the Commercial Electric Company of Detroit and the Detroit Supply Company.

## J. D. Holmes Made Manager of Magnus Feedwater Treating Division

The Magnus Chemical Company, Inc., Garwood, N. J., has announced the appointment of Mr. J. D. Holmes as manager of its newly organized Feedwater Treating Division.

## Westinghouse Appoints Finnell

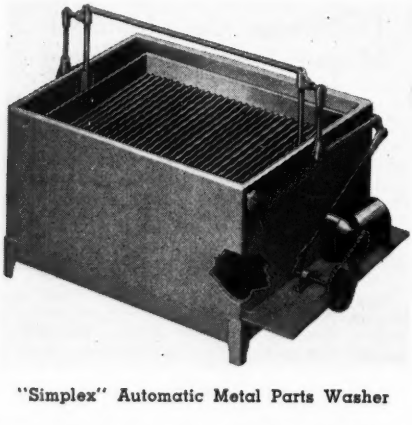
Appointment of Thomas C. Finnell as manager of the Industrial Department in the Eastern District of the Westinghouse Electric & Manufacturing Company was announced recently by James Boyd, Eastern District Manager.

Mr. Finnell succeeds C. W. Miller, who was named manager of the Application Department of the Westinghouse Radio Division at Baltimore. In his new post, Mr. Finnell will supervise the supplying of electrical equipment to war industries throughout New York State and northern New Jersey. Mr. Finnell joined Westinghouse in 1929 when he entered the company's graduate student course at East Pittsburgh.

# New PLANT EQUIPMENT AND Materials

## "Simplex" Automatic Metal Parts Washer

The Sturdy-Bilt Equipment Corp., Dept. P-4, West Allis, Wis., has announced an improved automatic "Simplex" metal parts washer, designed to replace complicated time-wasting methods of cleaning, washing and preparation of small metal parts, castings, stampings, and so on. Compact in design, it is said to combine a time-proved method with a new simplified action that does a thorough job in less time, with a consequent savings of man-hours.



"Simplex" Automatic Metal Parts Washer

The correct solution in the tank (as determined by the particular application) provides a chemical action during the soak, loosening grease, oil, dirt and foreign metal chips. The swishing action into and out of the solution provides a soaking and washing action that is said to remove all foreign material. Hot or cold solution may be used.

The tank is fully insulated and the cleaning solution is heated to a temperature of 120 to 130 deg. in a short time by means of steam, electricity or gas, as desired. An electric motor operates a simple lever mechanism which lowers and raises the material tray into and out of the soaking tank. The operator loads the tray, presses a switch, and the "Simplex" does the rest.

The unit is furnished in three sizes: 36 x 24 x 36 in. deep (130 gal. capacity); 48 x 36 x 36 in. deep (265 gal. capacity), and 60 x 48 x 36 in. deep (450 gal. capacity). Special sizes can be supplied to meet special requirements. "Simplex" units can also be used for preparing metals for further machining, for plating, enameling, and so on. They can be installed in many different departments or in a series—one unit for cleaning, another for rinsing or rust preventive coating, and others for special requirements.

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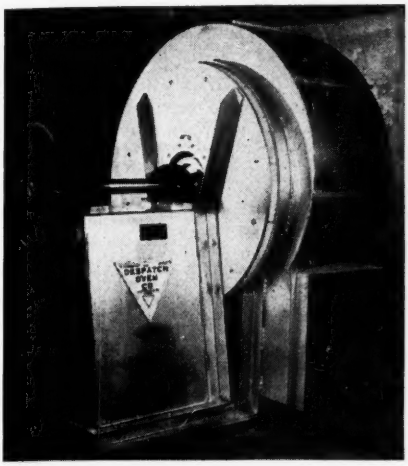
## Despatch High-Temperature Acid-Resistant Alloy Steel Fans

A line of high-temperature acid-resistant alloy steel fans which are said to be suited to virtually all heavy-duty high-volume requirements involving

temperatures up to 1,600 deg. F. is now being offered by the Despatch Oven Company, Minneapolis, Minn. Outstanding features include rigid design and precision balancing to assure smooth



Despatch High-Temperature Acid-Resistant Alloy Steel Fan

and quiet operation under widely varying conditions.

The fans are available in 11 standard sizes with wheels ranging from 12 to 48 in. in diameter and with capacities up to 20,000 c.f.m. All sizes are belt driven and are designed so that the outlet can be arranged in 16 standard positions. The shaft of each unit is supported on two large bearings which are air cooled. The fan wheel, shaft, and so on, can be easily removed without disturbing the housing.

Despatch Acid-Resistant Fans are of welded construction throughout. Pedestals, sides, and scroll sheets are made of heavy gauge metal having strong reinforcing angles. Other parts are said to be of equally durable and rigid construction to minimize vibration and withstand severe heat and load conditions.

The fans are available made of various alloy steels, including 18-8, 25-12, Monel, Inconel, and so on, for handling chemical gases, fumes, vapors, foundry dust, furnace and oven heats, pickling tank exhausts, and so on, at high temperatures.

## Prep-Pik-L

A pickling and scale-removing compound which is said not to cause corrosion on surrounding plant equipment has been introduced by Neilson Chemical Company, 6564 Benson St., Detroit, Mich., under the trade name of "Prep-Pik-L." The compound is used in a lead-lined tank and it is claimed that no fumes of a corrosive nature are evolved in the use of Prep-Pik-L. Reduction of the number of operations is said to make Prep-Pik-L especially advantageous where the metal is to be subsequently painted.

Before passing the metal into the Prep-Pik-L scale-removing material, it is first cleaned to remove any oil or grease film. Following this, the metal is immersed in the solution, which is used at a temperature of 180 deg. F. The time of immersion for the removal of the scale depends upon the nature of the scale itself. Generally, three to five minutes are required for the removal of heavy rust formations, about eight minutes for removal of annealing scale, and eight to twelve minutes for mill scale.

Following treatment in the Prep-Pik-I the metal is given one hot water rinse. After drying, the metal can be passed directly into the painting department with no further operations necessary, or if the metal is not to be painted, it passes directly into the subsequent machining, fabricating or finishing operations.

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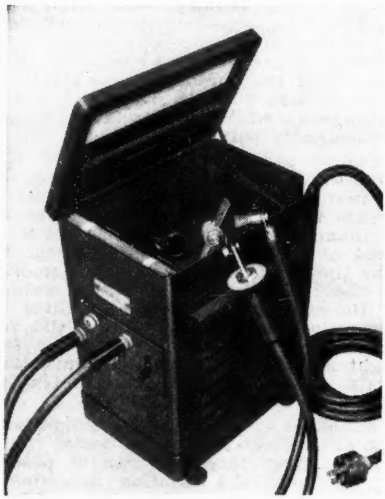
## Metco "Fuse-Bond"

A process whereby machine components and similar metal parts may be prepared for metallizing electrically has been announced by the Metallizing Engineering Co., Inc., 21 41st Ave., Long Island City, N. Y. The process, known as "Fuse-Bond," is said to afford an adequate bond on the hardest surfaces. It also simplifies preparation of narrow edges, flat areas, and cylindrical parts having keyways, and other interruptions in their surfaces.

Application of the process is by means of the Metco Fuse-Bond Unit. Operating on any 110 or 220 volt, single phase power line, this equipment fuses a rough deposit of electrode metal into the surface to be metallized. Electrodes are applied to the work with a special holder which uses up six electrodes at a time, depending on the size and nature of the part to be prepared. It is claimed that

small parts may be prepared with this equipment as easily as large shafts, since there is no excessive heating of the base metal or disturbing of its physical characteristics.

The Fuse-Bond Unit is compact and is contained in a cabinet measuring 24 inches high. The weight complete is 170 pounds. All cables and attachments fit into a bin in the top of the cabinet. Mounted on casters, the unit can be wheeled right to the job. An instruction manual provides operating data. According to the manufacturer, unskilled labor can operate the unit efficiently within an hour or so.



Metco "Fuse-Bond" Unit

## V-26 Protective Wrapping Paper

A greaseproof, non-corrosive paper has been announced by Sherman Paper Products Corporation, Newton Upper Falls, Mass., to protect highly finished metal parts against corrosion. Called "V-26," this protective wrapping paper is said to eliminate multiple wrapping operations at point of use, thereby permitting substantial savings in time. The paper is reported to meet or surpass all government specifications for greaseproof, non-corrosive paper.

Multiple wrapping operations are eliminated by combining two protective laminations in one paper. The inner ply provides a greaseproof barrier for the retention of corrosion-preventives used on metal products, while a strong outer ply protects the greaseproof membrane against damage in transit. Both inner and outer laminations are non-corrosive, consisting of neutral kraft, colored red in accordance with government specifications for Grade A non-corrosive papers. Both are creped for greater flexibility in wrapping, with a dead-limp folding quality. V-26 is available either with an outer film of wax that provides a self-sealing surface, or uncoated where the self-tack quality is not needed.

## All-Master Inter-Communication System

The "Super-Chief," a new product of the Talk-A-Phone Mfg. Co., 1219 W. Van Buren St., Chicago, Ill., has incorporated in its design many new exclusive features which are said to have never before been used in inter-communication systems. Outstanding among these is "Conference Traffic Control." This enables any number of stations to hold a private conference without interruption or eavesdropping from other stations outside of the conference group. When one of the conference group is being called, he is signalled by a light so that he knows that the call is waiting. Working in conjunction with the Traffic Control is the "Busy Signal Light." This light is illuminated when the line on another station to be reached is busy and so remains lighted until that station is ready for a new conversation.

Other features include "Uni-Trans" or one-way automatic transmission, especially effective for the dictation of letters and the complete recording of conferences. When "Uni-Trans" is used, the "Talk-Listen Switch" does not have to be operated.

The Super-Chief also uses the latest type finger-tip, push-button control which utilizes in its construction the "Hold-O-Matic Switch." In the construction of this switch all mechanisms are nickel silver plated and are of the self-cleaning, constant pressure type which assures quick positive action.

Units have amplifier of super-sensitive design which delivers an undistorted output of five watts and permits operation with undimished power and efficiency with the units as far as 3,000 ft. from one another. Each station is equipped with in-

"Super-Chief"

dividual volume control so that incoming volume may be adjusted to suit individual requirements.

Optional equipment is privacy earphone. When earphone is used, Talk-Listen switch does not have to be operated and unit works exactly the same as telephone. Volume for earphone may be adjusted.

Super-Chief is available in systems consisting of from 2 to 10 or 20, 30, 40, 60, 80, and so forth, stations.

## Dipmaster, Jr., Portable Electric Metal-Degreasing and Cleaning Tank

Fast, economical cleaning and degreasing of metal parts and products is said to be possible with the Dipmaster, Jr., a portable, insulated, electrically-heated dipping tank now being marketed by the Aeroil Burner Company, Inc., Park Ave. at 57th St., West New York, New Jersey. The normal capacity of the unit is 12 gallons of solution, the maximum capacity is 15 gallons.

The Dipmaster, Jr., is equipped with a heating element located inside on the bottom of the tank where it is completely submerged. Thus, there is no gap between the heating element and the liquid itself. In order to reduce heat loss to a minimum, the steel tank is insulated all around the inner shell.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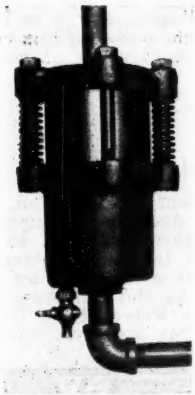


UNIVERSAL AIR FILTERS—for compressed air lines—have proved their superiority over the years in the removal of condensed moisture, oil and other impurities. Using a synthetic porous stone as the filter medium (in addition to the well-known principle of centrifugal action), this filter delivers pure, dry air for process use by the leading Industrials of the U. S. A.

Maintenance is simple and easy. Two filter stones are furnished with each unit to assure continued operation during simple cleaning process.

Detailed information will be gladly supplied on request.

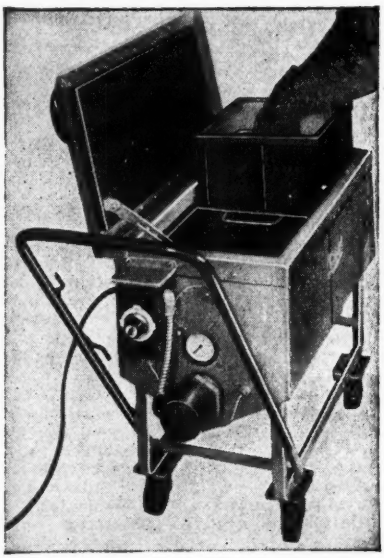
**UNIVERSAL FILTER CO.**

*Manufacturers*

**7025 MANCHESTER AVE.** **ST. LOUIS, MO.**

Consequently, average heating time from a cold start to boiling point is said to be only 1¼ hours.

The electric heating element can be removed whenever any cold solutions are used or the bottom of the tank is to be cleaned and the head of this element, as well as those of the thermostat and thermometer, is mounted to the rear head of the tank. This placement is said to protect them from damage and they can be seen and adjusted while in operation.



Dipmaster, Jr., Portable Electric Metal-Degreasing and Cleaning Tank

Two swivel-type and two rigid-type casters provide for easy maneuverability of the unit. It is ready for instant operation by simply plugging it in on 110 or 220 volt a.c. or d.c. current, using the extension cord with which the tank is provided.

Larger stationary models of the Dipmaster, Jr., are available, ranging up to 600 gallon capacity. They are heated by kerosene, city or liquified gases, with removable immersion tube heating units in the tank so that the heat is delivered in the liquids as it is with the electrically-heated Dipmaster, Jr.

## Gun "K" Oil

A solvent oil, to be known as Gun "K" Oil, has been developed by The Curran Corporation, Malden, Mass., for the removal of chloride salts from gun barrels. It is said to be especially adapted as a lubricant, cleaner and preservative for the bore of small arms; bore of cannon; the water side of turbines, pumps and boilers; wire cables; seaplanes; wet iron or steel surfaces, and similar products. Gun "K" Oil is also said to kill rusty finger marks, since it emulsifies and cleans salt left by perspiration on steel surfaces. It is also effective against acid soldering flux condensation and other sources of corrosion.

## Universal Air Filter

A new principle of air filtration, involving the actual filtering of compressed air through minute pores of a manufactured stone, is the result obtained from the Universal Air Filter now being manufactured by the Universal Filter Sales Co., 4221 Forest Park Blvd., St. Louis, Mo. This air filter can be

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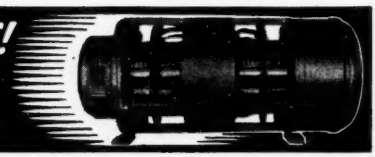
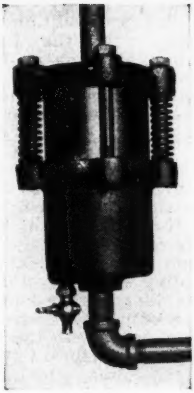


used with any make of spray gun that the user may prefer. According to the manufacturer, the Universal Air Filter eliminates bubbles and blisters and makes expensive touch-up work unnecessary.

The Universal Air Filter is furnished in two standard sizes — ½-in. with line pressure gage, reduced pressure gage and two hose outlets, and ¼-in. with reduced pressure gage and one hose outlet. Special units can be furnished to meet individual requirements.



Universal Air Filter

The filter medium is easily changed by removing only one bolt and without disturbing the piping in the slightest degree. The Universal Air Filter is claimed to be easy to install and keep clean. This unit is recommended by the manufacturer for dry, pure air, free of moisture, oil and other impurities.

## H-VW-M Small Diameter Buffs

To meet the need for small diameter, spirally sewed buffs with ¼-in. or reinforced pin hole center, Hanson-Van Winkle-Munning Co., Matawan, N. J., has developed a line of small buffs from 1-in. diameter and up. The sections are 30 ply x ⅛ in., spiral sewing. Any number of sections can be glued together to make up the desired thickness of the wheel. Small buffs of this type are generally used as headed-up wheels for polishing in "hard-to-reach" places, especially in the aircraft engine industry.

## Paasche Airconditioner Unit for Compressed Airline

Paasche Airbrush Company, 1910 Diversey Pkwy., Chicago, Ill., has announced an airconditioner unit for re-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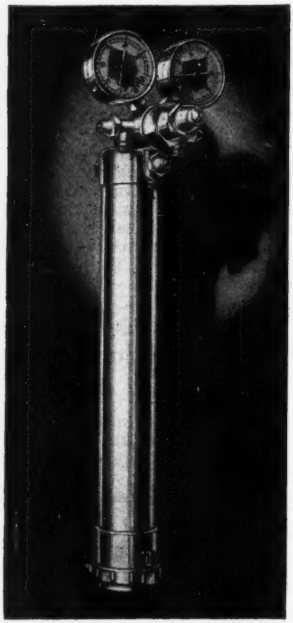
moving water, oil and dirt from compressed airline. It is said to be a definite improvement over previous types, a fact which has been proved in actual tests where the unit proved



Paasche Airconditioner Unit for Compressed Airline

to be highly efficient. The unit is constructed of non-corrosive metal throughout, and filtration is mechanical with no moving parts. No cotton, felt or fibrous filtering elements are employed that require frequent replacement.

The airconditioner unit can be supplied with the Paasche water drain which automatically discharges water as it accumulates. This feature eliminates daily hand-draining and prevents the trouble caused by neglect of this important duty. The drain operates on a new principle which is said to provide a reliable method for water removal under all conditions. Operation is simple and foolproof.

Incorporated in the unit is a Paasche air-regulator, insuring precise regulation of working air pressures and providing such features as the streamlined, machined brass body and pressure-locking adjustment assemblies. The distinctive design of the regulator is an important factor in the large air capacity of the unit, which increases the utility range.

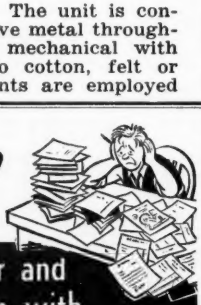
The unit is supplied in five sizes—6, 12, 24, 48 and 96 cubic foot—and with one to three outlets.

## Mattison No. J-135 Abrasive Belt Idler Stand and Pulley

Present grinding and polishing lathes can be easily adapted to the use of factory-coated abrasive belts at a small investment by the addition of a Mattison No. J-135 Abrasive Belt Idler Stand and Pulley—product of Mattison Machine Works, Rockford, Ill. The stand is placed at the rear of the lathe, permitting the use of an abrasive belt running over a contact roll or wheel on the lathe and traveling back around the idler pulley. With this arrangement, grinding is done on the belt instead of the set-up wheel.

The Mattison J-135 Stand is of substantial construction throughout. The ball bearing idler pulley is mounted on


Swamped with Work?



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Here is a machine that multiplies Man-Power — releasing men, women and their equipment for other work. APeCO makes PHOTO-EXACT copies, in your own place of business, up to 18"x22" —1 to 100 copies or more, at small expense. No chance for error. Foolproof operation. No special skill or dark room needed. • Prompt delivery on machines and supplies. Write for FREE folder now! Representatives in all principal cities and Canada.

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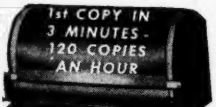
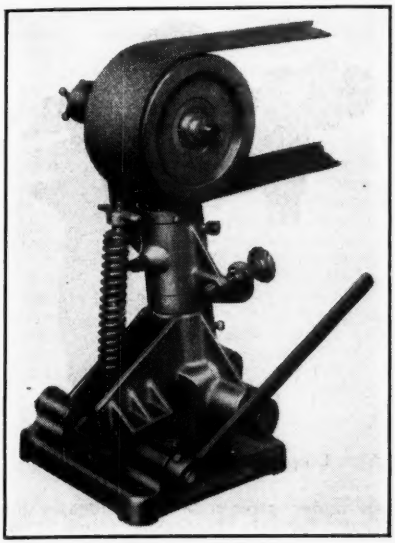



AMERICAN PHOTOCOPY EQUIPMENT COMPANY
2849 N. Clark St., Dept. DL-1, Chicago, Ill.

a yoke which can be swiveled by handwheel to align the pulley with the belt. Handwheel adjustment is provided for



Mattison No. J-135 Abrasive Belt Idler Stand and Pulley

controlling the position of belt on pulleys. A cam arrangement is provided for easy changing of belts.

The entire assembly swings on a hinge shaft mounted on the base. Slack in the abrasive belt is automatically taken up by sensitive spring tension; the spring is adjustable to suit various types of work. The stand is adjustable for either right or left hand by turning the column and upper assembly halfway around.

## Magnus Metal Cleaning Service

The Magnus Chemical Company, 208 South Ave., Garwood, N. J., is now offering a complete line of standard and specially designed vapor and solvent degreasers using the inhibited tetrachlorethylene solvent known as "Phillsolv." The degreasers are air cooled, allowing the machine to be portable.

Tetrachlorethylene boils at high temperature, has high density of both liquid and vapor, and is said to be very effective in cleaning. Magnus is offering vapor and solvent degreasers with a known-in-advance operating cost per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Flush under-surface and sling handles make this specialized Rolock annealing and pickling basket ideal for handling heavy loads of 105 mm. shell cases. Rolock engineers design crates, trays, racks, etc., for any exposures, all processes and capacities to 6,000 lbs. Write today.

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hour, and will engineer the complete job from surveying the cleaning operation to recommending and building the equipment—whether still tanks, continuous automatic washing machines or vapor and solvent degreasers.

## Eclipse Plastic Spray Gun Body

Eclipse Air Brush Company, 400 Park Ave., Newark, N. J., has developed a spray gun with a plastic body. The black plastic gun weighs a quarter of a pound less than the spray gun with aluminum body which it replaces. The lighter weight is an important factor in reducing fatigue.

The plastic is said to have good chemical resistance and is not affected by thinners, solvents, paint removers, and so on. It is strong and has adequate impact strength. The smooth black surface is easy to clean and, with its metal fittings, makes a neat appearance. The gun has been tested in places where equipment of this type is in constant use under strenuous conditions — shipyards, aircraft factories, munition plants, and similar locations.

Eclipse Plastic Spray Gun Body

## "Carbon Met"

The development of a solvent as a substitute for carbon tetrachloride, now used by war plants for cleaning metal parts, has been announced by the War Products Development Laboratory of The Curran Corporation, 6 Pleasant St., Malden, Mass. The solvent, designated as "Carbon Met," is described as a volatile, water-white methalated hydrocarbon solvent which evaporates clean and is non-flammable and non-explosive. It

**SALESMEN: Selling Metal Cleaning Equipment, Sturdy Bilt Corporation, West Allis, Wis.**

**McKeon's**

*"Liquid Sulphur"*

**FOR STRIPPING COPPER**

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is characterized by quick and powerful cleaning as well as dissolving action on gums, oxidized oils, burnishing compounds, and so on.

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**Use and Care of Fire Extinguishers.** An educational booklet entitled "Maintenance of First Aid Fire-Fighting equipment" has been brought out by American-La France-Foamite Corporation, Elmira, N. Y. The booklet is divided into six sections: (1) Vaporizing Liquid, (2) Soda Acid, (3) Foam, (4) Anti-Freeze, (5) Carbon-Dioxide Extinguisher, and (6) up-to-date charts giving complete data in condensed form as to extinguisher and engine characteristics, methods of operation, capacity, range of stream, and so on.

Inspection, upkeep, charging, discharging, and recharging are all thoroughly discussed with emphasis on the periodic practice-handling and discharge of the units under simulated fire conditions. All fires are not alike—nor all fire extinguishers. A knowledge of this fact is of more vital importance than ever today, with the ever-growing need for safeguarding our war factories from fire.

This timely and valuable booklet illustrates the various classes of fire and types of extinguishers and wheeled engines. The booklet is free upon request.

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**"Ebonol" Processes for Blackening Metals.** The Enthone Company, New Haven, Conn., has issued a group of four bulletins describing in detail the "Ebonol" processes for blackening metals. An eight-page illustrated folder in color is devoted to the "Ebonol" processes for blackening iron and steel, zinc and zinc alloys, copper and copper alloys, and aluminum and aluminum alloys. A second folder, four pages in size, gives details of the Ebonol "A" process for blackening aluminum. Ebonol "Z" process for blackening zinc and zinc alloys is the subject of another four-page folder, as is also Ebonol "C" process for blackening copper and copper alloys. In each of the bulletins the characteristics of the coatings, as well as specific operating details, are given. Copies of the folders free upon request.

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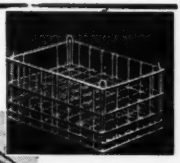

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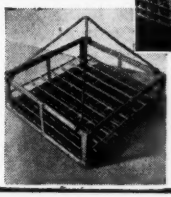

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# CATALOGS

## FOR YOUR LIBRARY

*To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.*

**1. Shell Cleaning with DuBoy Products**

A data sheet describing the soaker tank method with Actex 200, the solvent method with Actusol, and the industrial washing machine method with Actex 200 is now being distributed by The DuBois Company, 1120 W. Front St., Cincinnati, Ohio.

**2. Speed Production**

A booklet containing information about a new technique of grinding, finishing, and polishing that offers increased production to finishing departments is now being issued by Minnesota Mining & Mfg. Co., Forest and Fanquier Sts., St. Paul, Minnesota.

**3. Metal Cleaning Equipment**

A four-page folder which illustrates and describes a well-rounded line of equipment for cleaning war products such as cartridges, gun barrels, shells and similar products is now being issued by the Alvey-Ferguson Company, 162 Disney St., Cincinnati, Ohio.

**4. Rolock Specialized Processing Carriers**

In a four-page catalog, Rolock, Inc., 1400 Kings Highway E., Fairfield, Conn., presents its line of industrial baskets, crates, trays, and fixtures.

**5. Pentrate—the Modern Finish for Steel**

One of the most beautifully illustrated catalogs issued by the Heatbath Corporation, P. O. Box 78, Springfield, Mass., describes the Pentrate Phytanium Blended finish for steel products of all kinds.

**6. Howard Finishing Equipment**

A 33-page catalog which describes and illustrates 28 types of widely adaptable product finishing equipment is now being issued by the Howard Engineering & Manufacturing Co., 1056 Hulbert St., Cincinnati, Ohio.

**7. Metal Parts Washers**

Various models of Detrex Washers are pictured and described in a catalog issued by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Michigan.

**8. Industrial Fire-Fighting**

A manual entitled "How to Teach Fire-Fighting" which tells how to stage a fast-moving, interesting, instructive fire-class can be obtained from Walter Kidde & Company, Inc., 431 West St., Bloomfield, New Jersey.

**9. Surface Preparation of Metals**

Surface preparation of metals with Oakite materials and methods before black oxide finishing is discussed in 20-page booklet distributed by Oakite Products, Inc., 20 Thames St., New York, N. Y.

**10. Metal Cleaning Check Chart**

Quick help on the correct solving of metal product cleaning problems is offered through a simple check chart analysis sheet, recently prepared and now being distributed by The Hunnewell Soap Co., 116 W. Second St., Cincinnati, Ohio.